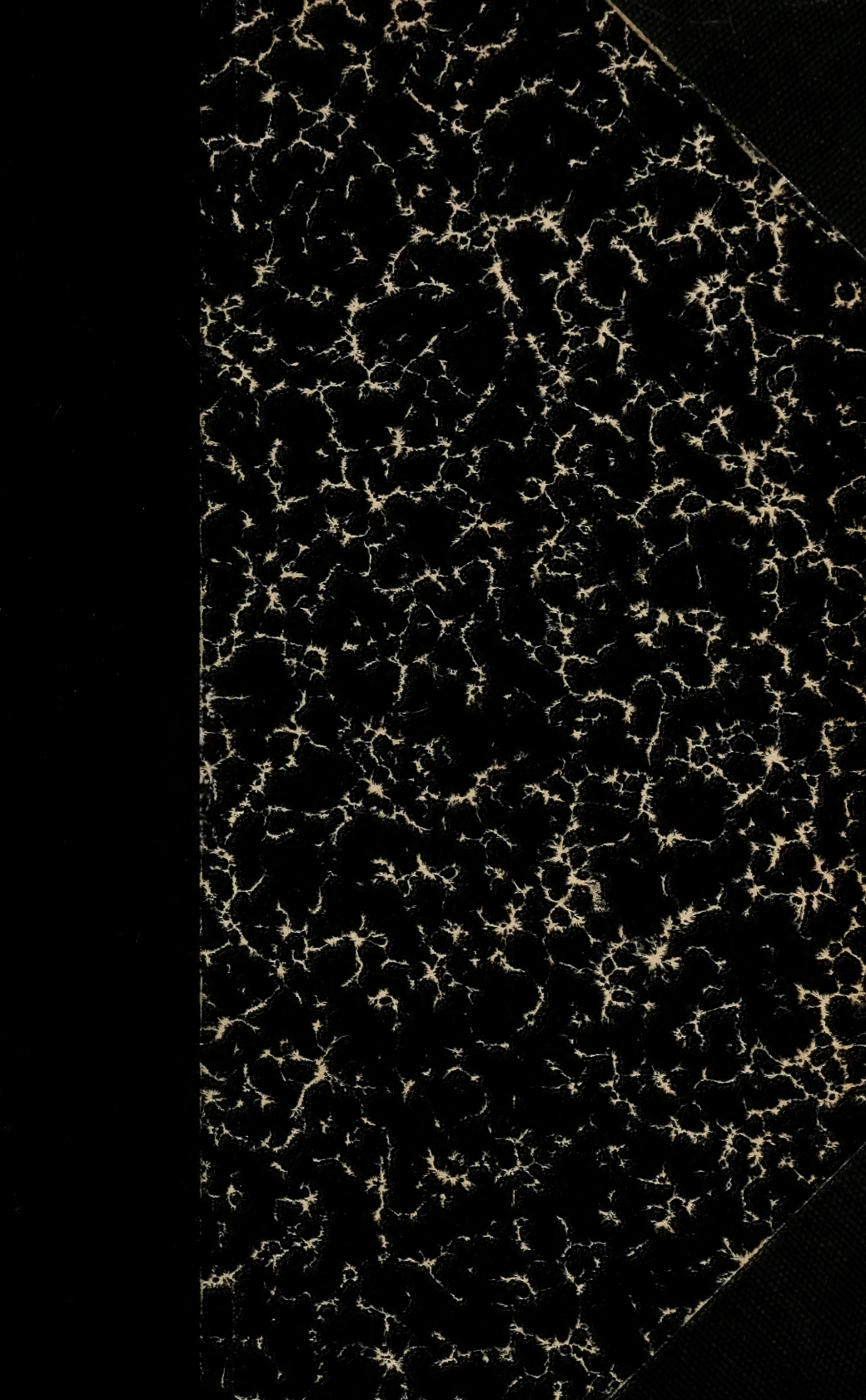




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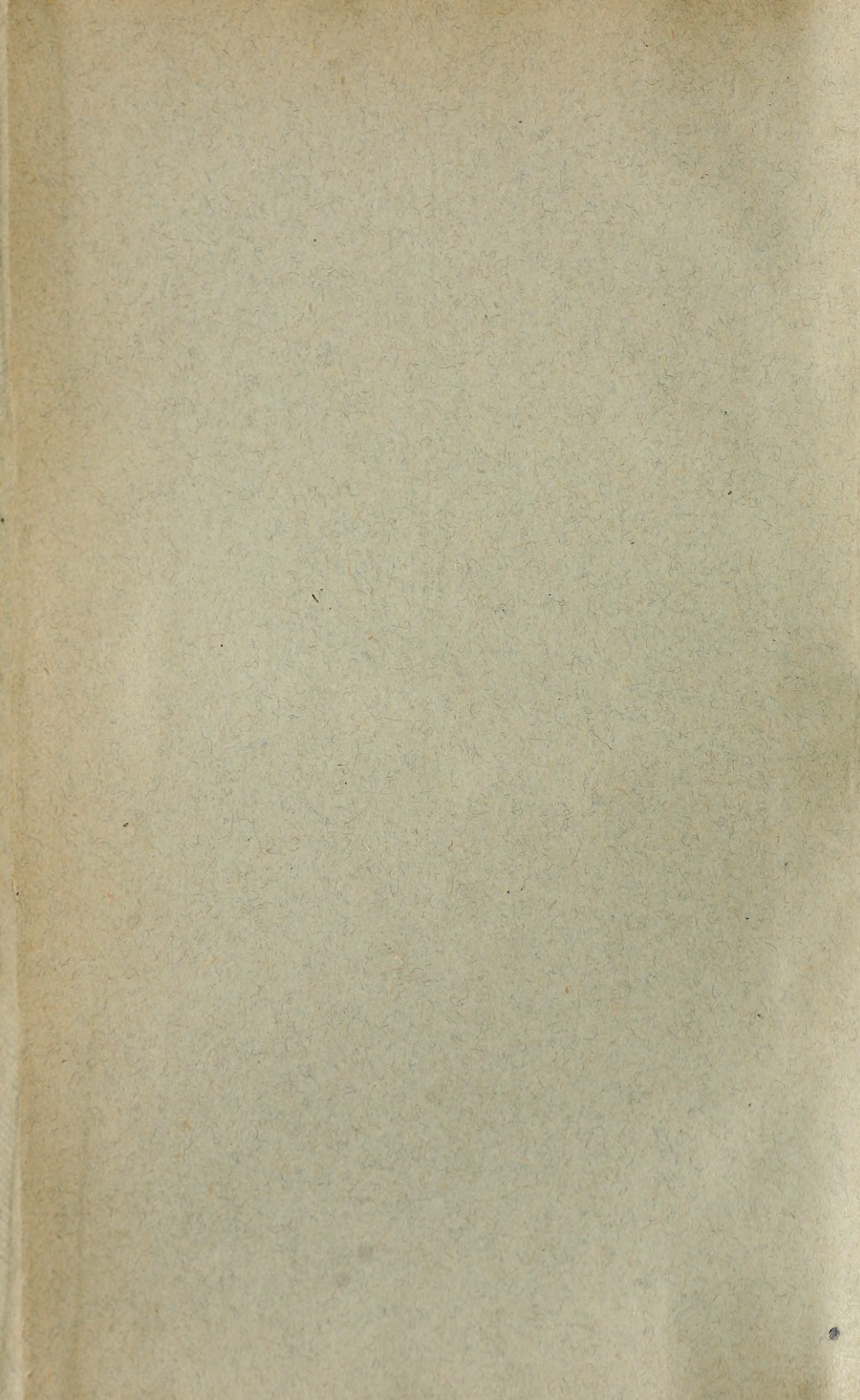
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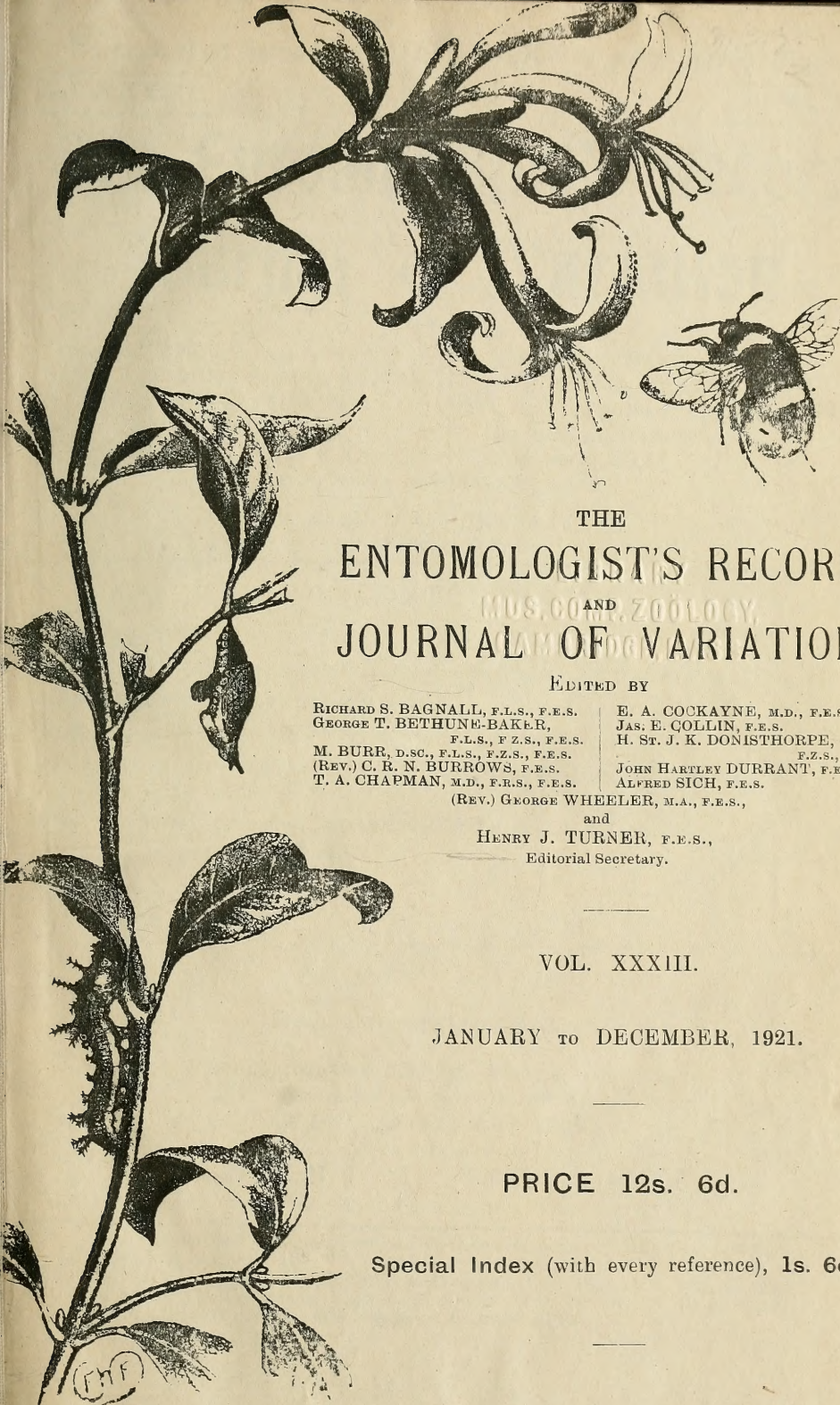


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THE
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AND
JOURNAL OF VARIATION

EDITED BY

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F.L.S., F.Z.S., F.E.S.
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The Entomologist's Record

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VOL. XXXIII. No. 1.

JANUARY 15TH, 1921.

EDITORIAL.

We are glad to be able to announce that Dr. E. A. Cockayne has consented to join our Editorial Staff, and in welcoming him most heartily we would remind our readers that his advent brings an old friend and contributor officially among us. We feel that he will be a real source of strength to us, for he is an experienced morphologist and microscopist and a first class field observer.

His experiences in the "ice free sea" during the war, as well as elsewhere, will probably be counted by him as events even to be remembered, quite regardless of the strenuousness of the times through which he passed.—G.T.B.-B.

Considerations on the possibility that Alpine species of Butterflies are possessed of a remarkable latent faculty, exercised under peculiar circumstances in connection with the Act of Egg-laying.

By B. C. S. WARREN, F.E.S.

Many collectors who use pill boxes for carrying their captures, will have noticed at one time or another that a ♀ butterfly so enclosed has laid a few ova in the box. This is, however, a decidedly rare occurrence, so my attention was drawn to the matter some years ago, when I noted ova, so laid, on frequent occasions; but it was not until August, 23rd, 1913, when two ♀ *Erebia manto* laid eighteen ova in two boxes, that I began to become interested in this unnatural habit. The eggs were fixed in rows to the sides of the boxes, and, with one exception, in which one egg was laid on top of another, each egg was separate from its neighbours.

I had in the weeks immediately preceding this date found ova deposited in boxes by several other species of *Erebia*, and subsequently noted the same on quite a number of occasions. Unfortunately, I made no notes at the time (except of the occasion mentioned above, and one other), but I was struck by the fact that all the species which behaved in this manner belonged to the genus *Erebia*. Although writing from memory, I can state with certainty that ova were deposited in this manner, on more than one occasion each, by *E. pharte*, *E. oeme*, *E. pronœ* var. *pitho*, *E. tyndarus*, *E. manto* and *E. gorge*, in the case of the last two on, at least, half a dozen times each.

every one of the species already mentioned as occurring at the 5000 ft. level, flying as strongly as ever; none the worse for their forty-eight hours under four inches of snow, though I noted a slight decrease in the numbers of *A. pheretes*, *P. hiera*, and *L. subalpina*. Five days later I visited the higher levels. The snow here had not melted until the morning of the 29th, consequently the four species already noted had undergone twenty-four hours longer confinement than those of the lower level, i.e., three days and nights. *E. lappona* was as abundant as ever, but decidedly more worn, and there were some additions to both *H. calaliae* and *B. pales*, which were obviously freshly emerged since the snow had melted, while *P. napi* var. *bryoniae* was not so numerous as it had been. Nevertheless, the result was sufficient to place beyond doubt the fact that all the species in question were, one may say, unaffected by forty-eight and seventy-two hours respectively under four inches of snow. From a very reliable local source I obtained much information about these summer snow-falls. In that part of the country, I was told that such snow-falls might be expected in any month of the summer, and sometimes lay for seven days. Higher up they were more frequent and of longer duration. The peasants welcome the snow when there is a spell of cold weather, for should there be frosts with fine weather the grass crop of the year is much damaged. This rarely happens, for frost without snow is unusual, and if the grass is once covered with snow no frost that comes does it the least harm, and in a few hours after the melting of the snow it is standing as erect as ever. It of course rarely attains there a height of more than twelve to eighteen inches. Thus Alpine butterflies, in any month, are sometimes subjected to these conditions, and I see no reason to suppose that the other species are not as well fitted to support the climatic conditions under which they live, as those I observed. In fact I think we may conclude that, like the vegetation, they benefit by this enforced entombment, which protects them from the frost and the icy wind which usually accompanies it.

The following records show such conditions may prevail anywhere in the Alps. Doubtless if looked for, many similar records would be found in other publications. All the following references apply to the *Entomologist's Record*.

Mr. D. H. Pearson notes (vol. xxi., p. 264), at Binn on the night of June 22nd, 1909, "heavy thunderstorm and hailstorm with three or four inches of snow." The morning after, when the snow melted, *L. arion*, *A. escheri*, *P. eros*, and *P. mnemosyne* were seen, the latter very common. On going on to Eggishorn he adds, "weather grew worse . . . and two or three days of snow and wind."

Mrs. R. E. Page writes (vol. xxii., p. 127), that at Zinal the first few days of her stay (Aug. 3rd-5th, 1909), "were very cold, snow falling at night."

Mr. A. L. Earl writes (vol. xxii., p. 167), at Zermatt on June 4th, 1909, "cold throughout the week, rain every afternoon until the last few days when it snowed continuously."

Mr. Pearson (vol. xxiv., p. 267) writes, "the day after we left Pontresina (July 21st, 1912), there was a fall of snow."

Mr. B. S. Curwen (vol. xxiv., p. 289), notes on July 24th, 1912, between Handeck and the Grimsel Hospice, the following species:—*C. phicomone*, *C. hyale*, *E. pharte*, *E. mnestra*, *E. gorge*, *E. tyndarus*.

and *V. optilete*, and adds "two days previously there had been over a foot of snow." In view of the date it is certain that all these species had survived burial under even this depth of snow. Unfortunately Mr. Curwen does not tell one how long the snow had lain.

Mr. A. L. Earl (vol. xxviii., p. 54), records a "twelve hours thunderstorm with six inches of snow" on July 26th, 1913, at Pontresina, which put him to flight; but Mr. H. J. Turner (vol. xxix., p. 161), notes on August 17th, 1914, the following species which had "successfully weathered" twenty-four hours incessant snow-fall:—*A. niobe*, *A. aglaia*, *P. brassicae*, *E. goante*, *E. tyndarus*, *E. melampus*, *A. medon*, and a doubtful *H. alveus*.

I think no more need be added to show that all Alpine species, no matter what their season of flight, may be subjected to these conditions and are (as a whole, not individually) quite unaffected by them. This being so, is it unlikely or unnatural, that the ♀ can lay under similar circumstances?

Then there is another remarkable point to note. All the species, which first attracted my attention by their readiness to lay in pill boxes are, it may be remembered, Erebiid species. Now Dr. Chapman, whose experience in obtaining butterfly ova is probably second to none, writes (*Ent. Rec.*, vol. xxiii., p. 233) of Erebiid species, that they are "often difficult to induce to lay eggs." This, of course, means in captivity, in as natural surroundings as Dr. Chapman could provide for them; yet, shut up in boxes, they show a far greater readiness to lay than other species. What does this suggest? What, but that the conditions under a net bag with light and food plant, are not as natural to these species as those of the box. We may take it that the inability to fly is disconcerting in the former case, but compatible in the latter. The only natural circumstances which would, in any degree correspond with the position of the butterfly in the box, are those experienced by the buried butterfly. It probably often has, when buried, the additional incentive of foodplant, lacking in the pill-box, but again it often may not; and the fact that eggs are so freely laid on the sides of the box, suggests to me that the buried insect may often lay on a rock. The two principal elements wanting in the pill boxes are, of course, moisture and the lower temperature, but this does not seem to affect the Erebias. Possibly it accounts for the Alpine *Lycanids* and *Hesperias* not having, in my experience, laid in the pill boxes; but I must add that I have not at all so frequently had these species enclosed for a sufficient length of time.

The most unexplainable hypothesis which has to be conceded, if we maintain that Alpine species possess this faculty, is that it can be conserved by a species, although only required intermittently, lying in abeyance for long periods. For example, in many seasons if the weather be fine, a given species will be able to lay its eggs without having recourse to this faculty, especially in a series of fine seasons, perhaps ten might pass in succession without the necessity arising; but, in the eleventh if required, the insect must be in full possession of the faculty which has passed down to it, although unrequired and unexercised by ten generations, if it is to benefit by it.

Although this hypothesis is perhaps not one one would readily accept, yet I think we find some support for it in the fact that on rare occasions lowland species of butterflies will lay an egg or two in a box.

In these cases what is the incentive? My own experience on this point is, as already mentioned, limited to two instances; and one of them (*P. icarus*) is an insect which often is found within the Alpine region. It therefore, to a certain degree, may have developed (or retained) the habits of an Alpine species. But the essentially lowland species which exhibit a tendency to lay in such circumstances, cannot be accounted for in that way; and though there can be no doubt that such occurrences are very rare, I think one can but regard them as the re-assertion and adaption of a natural instinct, once essential to the species in question, or rather to the ancestral type from which it was evolved, which in a remote past existed under very different climatic conditions. That after such a lapse of time as this concludes, the instinct still asserts itself, no matter how slightly, is suggestive that such a faculty as we have been considering, would be in no wise impaired by lying in abeyance through ten, or many more generations.

Another contention, which may be brought forward, is that if Alpine species can survive burial they do not need to lay in that condition, but can resume their task when liberated again. To accept that contention we must assume that they can live under snow for an indefinite period; in the case of those species located above 6500 ft. for perhaps as much as fourteen days, and for all species for seven days and nights; the longest period of which I have obtained authentic information of snow lying in July, at 5000 ft. This, it does not seem to me, we can do, for although it is impossible to put a fixed limit to the length of time which they may survive, there is no doubt that, as has been already noted, even during a period of no longer than forty-eight hours, a certain number of individuals succumb, and the complete want of butterflies, in especially poor summers, which has been observed on occasions by collectors in the high Alps, is probably to be directly attributed to a longer spell of snow than they can survive. That when only quite a short time buried it is likely no eggs are laid, I have already suggested, but when it comes to a matter of days, I feel sure if the eggs were not laid, they would never be laid at all. Both these points are borne out by the fact that in boxes I have never found an egg laid, unless the butterfly had been enclosed for the best part of a day.

Again, in the case of late summer species: it is not an uncommon occurrence at altitudes over 6,000 ft. for snow falling in late August to be followed by successive falls at short intervals, so that the first fall has not completely melted before the next covers it again, and so it passes into winter without a break. Further, in considering the length of time any species can be buried and survive, one must remember that the depth of snow covering them may greatly affect this. The average depth of summer falls at altitudes between 5000 and 6000 ft. rarely exceeds five or six inches, but it can be double that (see Mr. Curwen's note already quoted), and of course at higher levels it may frequently be so. It is quite possible that a quite short period under a greater depth, might be no more detrimental to the insects than a longer period under less; but data on this question are wholly wanting.

One more point arises which might be used as an argument against my theory. The buried butterfly, of necessity, lays its eggs on any available surface. What would become of the young larvæ on hatching from these eggs, possibly situated on a rock, or some plant, other than their foodplant? With species with very specialised food-

habits, the young larva might have to travel a little distance to get to its particular plant (that it can both feed and travel under snow is almost certain), but in such species the ♀ probably goes to rest in proximity to, if not on, or under, the foodplant. In many Alpine species too, the larvæ probably make their first meal off the eggshell; this I know to be the case with all those *Erebia* species mentioned already as having laid eggs in boxes. This would provide them with sufficient food to enable them to travel a moderate distance. The grass feeding larvæ, like the *Erebias*, will never have more than an inch or two to move. All the eggs of the *Erebia* species, which I had, hatched in thirteen to fifteen days; it therefore must often happen that the eggs of those species which lay in late August, or even mid August (*glacialis*, *goante*, *euryale*, *pronoë* var. *pitho*, *gorge*, etc.), are snowed over before they hatch. This fact justifies my previous assertion that young larvæ can feed and travel under snow; if not, we should have to accept the almost impossible theory that the larva of any Alpine species of *Erebia* can hibernate at will in any stadium from newly hatched to six weeks old, according to the weather. This affects, more or less, all species which do not hibernate as an egg. It may be useful to add that the Alpine grass keeps fairly green under the snow, well into December, so that so far as the condition of the vegetation is concerned, there would be nothing to prevent the larvæ feeding for the requisite length of time to attain a certain standard of development before commencing to hibernate.

In conclusion, we have two irrefutable facts to reconcile: firstly, the meteorological conditions pertaining to the high Alpine regions, and secondly, the presence of butterflies in those regions. There have been, without doubt, in past centuries, repeated cycles of bad summers, in which the ordinary duration of the flight period of all Alpine species will have been lessened by half, a quarter, or three-quarters, their usual length; and if we assume, not merely that the species are unable to lay under snow, but that to do so is not a completely natural function with them; then it follows that the repeated decrease in the amount of ova laid each year, reduced in proportion with the flight period of the species, must have so thinned the numbers of the species affected, that gradually, first one then another must have become extinct, until the whole butterfly Fauna of the high Alps would, long since, have ceased to exist.

The Pyrenees in 1920.

By DOUGLAS H. PEARSON, F.E.S.

The Pyrenees had long been calling and after six years of enforced home keeping they clamoured with a voice that could no longer be disregarded and my brother and I decided upon a trip.

Leaving London early on June 23rd, we arrived in Paris in the evening and took the night train for Luchon, where we were timed to arrive at about 8.30 p.m. In passing through southern France it was interesting to note that oxen were almost universally used for farm work instead of horses, and it was quaint to see oxen drawing a modern hay cutter or reaping machine. We were landed at Montrejeau about mid-day with a wait of 5 hours before the train went on for Luchon, and after having disposed of an excellent lunch

at the station restaurant, sallied forth to explore the entomological resources of the district. In a field near the station we found *Colias edusa* in very fresh condition and with them 2 or 3 *Everes argiades*, but when the good lady of the farm explained that we were more or less in her clover crop we sought pastures new by the side of the river. While I stayed behind to catch *Nordmannia (Thecla) acaciae*—somewhat past their best, my brother worked some low ground near the river and called out that he had taken something new. This proved to be *Heteropterus morpheus*, which was quite an unexpected find, and we managed to take half a dozen, including both sexes. They were flying round some brambles and I took the first to be a "hair-streak" as it had much the same style of flight. One or two *Lycaena arion* and other oddments made up quite a decent bag and we returned to the station well pleased with the short excursion.

We stayed at Luchon from June 25th to July 1st, but were somewhat unfortunate in the weather, the mornings being usually rather like a Turkish bath and the afternoons devoted to thunderstorms. On the 25th we walked up to the Hospice de France, a long uphill trudge—taking on the way *Erynnis altheae*, which were in very good condition, but only appeared singly at long intervals, and one *Erebia oeme* taken on a steep bank not far from the Hospice. The ground round the Hospice looked excellent, but we had no sooner arrived than thunder began to rumble and after a cup of tea we did the homeward tramp in a steady downpour.

On the 26th we tried the Vallée de Burbe, branching off from the Hospice road near the old ruined tower and found very good ground. *Argynnis cydippe (adippe)* were large and strongly marked, but we were only able to turn up 3 of the var. *cleodoxa*. Some nice *L. arion* were taken, with tendency of spots to run into streaks, and one *Lampides boeticus* which was a new species to me. On the 27th we went a short distance up the road towards Lac d'Oo, took another *L. boeticus*, several *Pararge maera* var. *adrasta*, and one or two *P. aegeria* which were very deep in colour and practically the same as a brother had recently brought me from Algeria, being much darker than my Swiss specimens. In hopes of finding a breath of fresh air, we took the mountain railway up Superbagnères on the 28th, but the flies which had tormented us in the valley were in legions on the mountain, and of all sizes from the Scotch cleg to a horse-fly about $1\frac{1}{4}$ inches long, who carried a bradawl in his business end and only sulked if you boxed his ears or smote him with a stick. It was good to be among the alpine flowers again, and we were soon busy netting *Erebia epiphron*, which showed a considerable amount of variation, *Melitaea aurinia* (not *merope*), a single *Erebia ceto* and other things. We enjoyed our lunch seated among the *Dryas octopetala* and *Rhododendron*, but before it was finished thunder began to roll round and then the rain began. It came in such blinding sheets that one could not see 20 yards ahead and it was only by keeping along the ridge that we found our way back to the large hotel, which is being built at the railway terminus and which we could not see until we were close to the building.

An expedition up the Val de Lys was spoilt by rain and want of sun and nothing was taken, but the ground looked promising.

On July 2nd we left Luchon for Gavarnie, and on arriving at Luz found it too late for the diligence, and on the advice of the station

master hired a motor to take us up to Gavarnie. It was a weird machine and we agreed that 3 trips at the rate charged would just about pay for the car. It broke down twice on the road and was only persuaded to resume action after much tickling of the carburetter, and as the boy who drove found it necessary to look at his hands every time he changed gear, we missed the boundary wall which kept us out of the scenery several times by a very slender margin. It was with a sigh of thankfulness that we drew up at the Vignemal Hotel with an added stock of grey hairs.

Gavarnie is a truly delightful spot and we spent the time until July 16th very happily and wished it could be extended. The famous Cirque we left to the donkey riders, but worked hard to get samples of the entomological treasures of the district and were very fairly successful. Our favourite ground was the Val D'Ossue with its tumbled rocks and rushing river of beautiful clear water, but we found the lower part of the valley most productive. Near the entrance *Erynnis* (*Carcharodus*) *tavaterae* was met with, a small form in good condition, and we managed to take a short series, but the most interesting species in the valley was *Melitaea didyma*. In the Rhone valley where *didyma* is sometimes very plentiful, one occasionally meets with the var. *alpina*, but I have always looked upon it as rather a prize. Here we did not meet with a single normal ♀, all being of the var. *alpina*, or more like the description of *meridionalis*. In my examples from Switzerland and Modane the reddish or sometimes yellowish ground colour shows on both upper and lower wings. The Gavarnie specimens are very varied. In most of them the ground colour is greenish-grey and in one both fore and hindwings are nearly black. Two have blue spots in the lower wings and one has the outer row of black spots extended into streaks. The ♂♂ have a darker border than most of my Swiss specimens and one has large black blotches on the upper wings. They form a lovely series, but unfortunately the ♀♀ were by no means plentiful, and we would sometimes work for an hour without taking one. We only took one *Agriades coridon* at Luchon, and the males were only just out when we arrived at Gavarnie, but became plentiful later. We examined a considerable number and with one exception—which is moderately spotted—all were very washed out and feebly marked on the underside. We only took 3 ♀♀ of a very ordinary brown form. *Plebeius aegon* (*argus*) swarmed in the valley and continued plentiful up to about 6000ft., but appeared to be of a very ordinary form. In this valley we also took a few *Melitaea dictynna*, which are by far the lightest form I have met with of this species. We made several excursions towards the Port de Spain, and on one occasion went over the border but were met by such an icy blast that we were glad to turn our backs to it and get into shelter. On the way up we found a spot for *Erebia lefebvrei* and when there was not a howling wind we managed by patient work to secure a nice little series. Dr. Keynes says that *Erebia stygne* only crosses the screes or haunts the edges, but on this particular scree this was not the case, as one could watch an insect flying up and down the scree in exactly the same way as *lefebvrei*, and when at last it came within reach and was netted it would over and over again prove to be *stygne* and provoke unparliamentary language. Just before reaching this scree and near the main stream, a lovely brook of clear, cold water

wells out of the ground, and several very pleasant meals were taken there and all efforts to drink it dry were unavailing.

We worked very hard to find *Latiorina pyrenaica*, both on the way to Port de Spain and also on the way up Pimené, but had no success until July 12th when we took six on the way to Port de Spain and one more on the same ground on July 15th: we were no doubt too early for it. *L. orbitulus* we did not find at all.

On July 13th we started in a thick fog by the lower road up Pimené, and where the path crosses a steep gulley we found a sooty black *Erebia* which I take to be *Erebia manto* v. *caecilia*. Our nets were so drenched with fog as to be useless, but we managed to box a nice little series as they sat on the dripping grass heads. They seemed to be confined to a small patch about 20 yards by 10 as we could not find them either above or below, and possibly they came up the gulley.

Melanargia galathea var. *leucomelas* is said to be found near the village, but though we netted and examined a large number we failed to turn it up.

The flowers were interesting but were not in such profusion as in some Swiss valleys. At Luchon we found the "Sweet William," which was new to me as a wild flower, and a pale *Viola* with stem 12 to 18 inches long and a long spur. *Ramondia pyrenaica* was going over at Gavarnie, but there were still some fine blooms left, and in some places were grand specimens of *Saxifraga longifolia*, which does not appear to bloom until the plant reaches a considerable size. On Pimené we found a small *Colchicum*, so dwarf that the petals lie back on the turf. Gentians were rather poor and *G. acaulis* generally looked ill-grown and unhappy, but we found some beautiful patches of the little *Gentiana nivalis*.

The most striking flower at Gavarnie was the purple Iris, and when seen in a mass on a mountain side it was a sight to be remembered.

Of the black and white Skippers, *Hesperia carthami* was fairly common, but so small in comparison with Rhone Valley specimens as to be recognised with difficulty. We took several *Powellia sao*, and some others, which at present I do not feel competent to name.

On July 16th we moved on to Biarritz and walked to the Lac Mouriscot, where we took *Heteropterus morpheus* and *Coenonympha oedipus* among the reeds, but neither were plentiful and many were decidedly past their best. *Enodia dryas* was in fine condition and we took a nice series, including some large ♀ ♀, and also a single specimen of *Hipparchia (Satyrus) arethusa*.

We left Biarritz on the 20th and arrived home in the early hours of the 22nd after a tedious journey, but well content to have again felt the sun and tasted of the joys of the chase.

Lepidoptera in Peninsular Italy during the year 1920.

By O. QUERCI.

(Continued from p. 227.)

When, at the beginning of the month of June, 1920, I was persuaded that every hope of collecting in Florence was excluded, I took counsel with Dr. Verity as to the best mode of employing my time. It was decided that I should go to the marshes of the lake of

Massaciuccoli (Lucca), where many years ago there was collected a form of *Chrysophanus dispar*.

On the morning of June 9th I went to the Pian di Mugnone, near Florence, and Dr. Romei left for Monte Morello. On the Mugnone, considering the time of year, I ought to have found in abundance *M. galathea*, *E. jurtina*, *P. tithonus*, *P. brassicae*, *M. didyma*, *M. athalia*, *B. hecate*, *C. arcania*, *N. ilicis*, *A. flava*, *T. acteon*, *Z. stoecchadis*, *Z. carniolica*. I perambulated the whole zone from morning till night, not being persuaded that on such a splendid day some insect would not fly. At night I returned home with 3 specimens, and soon after my son-in-law, who had walked for 14 hours on the mountains, came back with one *P. argus*.

The following morning I left for Torre del Lago, which is the nearest station to the lake of Massaciuccoli, and tried to penetrate into the marshes, but every road was closed by the walls of the Villas, and so I had to turn back passing through the whole Pineta of Migliorini, where I only saw a few shabby specimens of *Epinephele jurtina* and *Syntomis phegea*. From Migliorini, along the dyke of the river Serchio, I went to Vecchiano without finding anything except two *P. icarus*, and from Vecchiano on the following day I penetrated into the marshes of the lake. I walked for many hours exploring the wettest and most grassy places, but insect life seemed suspended, not a butterfly, nor a fly, I only saw a red dragonfly hovering over the muddy water of a canal. On returning from this unpleasant excursion I took the train and arrived in the evening at Castelnovo di Garfagnana.

On the morning of June 11th I left by motor car for Fivizzano, the pretty village destroyed by the earthquake of September 7th, 1920. I did not find any favourable localities and I immediately went to Piazza al Serchio, from which I went on to Gorfogliano in the midst of the marble region. From Gorfogliano, by the valley of Acqua Bianca, I ascended the peak of the Pisanino, 5000ft., and reached a high valley full of snow. On the grassy slopes of the valley I collected an *Erebia gorge* and an *Aglais urticae*, nothing else. Returning to Gorfogliano I crossed the mountain to go to Vagli Sopra, and I went towards Monte Tambura, for I was convinced that the marble region, dry and stony, was certainly not suitable for Lepidoptera.

From the valleys of Monte Tambura I had seen Monte Sumbra, whose softly undulating slopes contrasted with the other pointed and arid summits of the Alpi Apuane. This induced me to go to Careggine, where I remained collecting till the end of July.

My wife and daughter ought to have gone to collect on the mountains of Calabria and ought to have left at the end of April, but from various causes their departure could not take place till the 12th of May. After short halts at Rome and Naples they arrived at Cosenza on the 16th of the same month, and went to Rogliano situated on the mountains of the Sila. A long excursion in the neighbourhood of the village showed my family that the locality was too intensively cultivated to be suitable for their purpose. In the railway journey from Paola to Cosenza they had remarked some uncultivated localities, so they returned to San Fili where they found lodgings.

San Fili is about 2400ft. on the coast range of Calabria, and from it my family could ascend by a path to the summit of the mountain

chain among beech woods with wide clearings full of high ferns. The locality was judged excellent; the people of San Fili were hospitable and respectful, and used gentle pressure on my family to remain. Every time that my wife and daughter went up the high mountain they were accompanied by two Forest guards.

During the first days, from the 18th to 26th of May, the weather was fine and the collection of Lepidoptera promising enough, although the season was too advanced for the "precocious" species to fly and only damaged specimens were found. As many as 43 species of Rhopalocera were present, but nearly all in small numbers. The more abundant species were *C. semiargus*, *P. amandus*, *M. cinxia*, *B. enphrosyne* that is those generally scarcer, whilst of the species generally commoner; *P. icarus*, *N. ilicis*, *P. rapae*, *M. brassicae*, *C. pamphilus*, *M. didyma*, *P. cardui*, one saw very few individuals flying. At the distance of 500 miles the phenomenon was identical with what I had observed at Florence.

One of the principal objects of our journey in Calabria was the collection of *P. apollo*, race *pumilus*, Stich., *P. mnemosyne*, race *calabrica*, Trti., and *Melanargia arge*, race *turatii*, Rostagno (= *cocuzzana*, Staud.). These species were searched for carefully and the locality seemed excellent for their development, but the *apollo* was never met with and of the *mnemosyne* and the *arge* only a few individuals were collected. With regard to the *P. apollo* it must be noted that it scarcely emerged at all this year in Italy. On the Alps of South Tyrol, where *apollo* is always most abundant, Dr. Verity only took a very few specimens; Dr. Romei did not find it at all on the Monti Sibillini, where it is also abundant, and on the Caronie, in Sicily, Signor Ragusa only succeeded in collecting 7. I myself, on the Alpi Apuane, in spite of continued researches during two months and in the most favourable season, only saw two specimens.

On May 27th, 1920, the collecting in Calabria was interrupted by rain. The first of June was fine and the *Zygaenae* appeared abundantly, but the bad weather returned and continued almost uninterruptedly till June 17th, preventing any collecting.

On June 4th, taking advantage of a brief cessation of the rain, my wife and daughter went on to the mountain and made an important capture: the *Syntomis ragazzii*, Turati. They had little knowledge of the fine discovery made by Count Turati; they only knew that besides the *Syntomis marjana*, Staud., a new *Syntomis* had been found in Southern Italy, and they at once conjectured that the specimens found must belong to this new species, which they had never seen before.

On June 17th the weather became fine again; all the spring Lepidoptera had disappeared and were replaced by the summer ones. From June 17th to 27th there emerged the second broods of *R. phlaeas*, *L. dorilis*, *A. thersites*, *P. icarus*, *A. medon*, *C. croceus* (*edusa*), *L. sinapis*, *P. rapae*, *M. brassicae*, *C. pamphilus*, *P. megera*, and the emergence of the summer species began: *P. ligurica*, *P. argus*, *S. fagi* (*hermione*), *S. circe*, *S. cordula*, *S. semele*, *M. athalia*, *A. niobe*, *A. cydippe*, but just as everything seemed turning for the best, on June 28th, all emergence of insects ceased.

Vegetation was luxuriant, weather splendid, but collecting no longer offered any interest. One could walk for hours without collecting anything.

The hope of finding *P. apollo* and the females of *S. cordula*, *A. niobe*, and *S. ragazzii* detained my family at San Fili till the first days of July, but the females did not emerge, so that on July 5th, after a long and fruitless mountain excursion, my wife and my daughter decided to leave Calabria and to come to me in the Garfagnana. It was absolutely not worth while to wait for the end of the "SUMMER PAUSE," which appeared to be very protracted, and to remain so far away in these turbulent times in which all communications might be cut off. After four days' journey my family were re-united at Careggine on July 10th.

In the subjoined list I note all the species collected in Calabria from May 19th to July 5th, 1920.

Zygaena purpuralis, Brunn., race not identified, June 1st-17th. *Z. scabiosae*, Schev., race *romeo*, Dup., June 1st-20th. *Z. stoechadis*, Bkh., race *calabra*, Vrtty., May 19th-June 20th. *Z. lonicerae*, Schev., race *silana*, Burg. (= *herthae*, Staud.), June 1st-20th. *Z. meliloti*, Esp., race *charon*, Hb., June 1st-20th. *Z. oxytropis*, B., race not identified, May 19th-June 7th. *Z. carniolica*, Scop., race *florentina*, Vrtty., June 7th-20th.

Procris statices, L., race not identified, May 20th-June 1st. *P. tenuicornis*, Z., race not identified, May 24th-June 4th. *P. cognata*, Rbr., race not identified, May 20th-June 4th.

Syntomis ragazzii, Trti., race *ragazzii*, Trti., June 4th-20th.

Erynnis alceae, Esp., race *australis*, Vrtty., June 17th. *E. althaeae*, Hb., race *australiformis*, Vrtty., June 17th.

Hesperia armoricanus, Obth., race *fulvoinspersa*, Vrtty., May 19th-26th. *H. carthami*, Hb., race not identified, May 19th-20th. *H. malvoides*, Elw. and Edw., race *pseudomalvae*, Vrtty., May 19th-26th.

Powellia sao, Hb., race not identified, May 19th-26th.

Adopaea lineola, Ochs., race *clara*, Tutt, June 1st-17th. *A. flava*, Brunn. (= *thaumas*, Hufn.), race *iberica*, Tutt, June 1st-17th.

Thymelicus acteon, Rott., race *ragusai*, Vrtty., June 1st-27th.

Agriades sylvanus, Esp., race *sylvanus*, May 19th-26th.

Rumicia phlaeas, L., race *nigrioreleus*, Vrtty., I. gen. *phlaeas*, May 19-24th. *R. phlaeas*, L., race *nigrioreleus*, Vrtty., II. gen. *nigrioreleus*, June 20th-27th.

Loweia alciphron, Rott., race *romanorum*, Fruhst., May 24th-June 17th. *L. dorilis*, Hufn., race *italorum*, Vrtty., I. gen. *italorum*, May 24th. *L. dorilis*, Hufn., race *italorum*, Vrtty., II. gen. *italorum*, June 17th-27th.

Glaucopsyche cyllarus, Rott., race *pauper*, Vrtty., May 19th-24th.

Scolitantides baton, Bgstr., race *obscurata*, Vrtty., June 20th-23rd.

Agriades thesides (Gerh.), Chapman, race not identified, II. gen., June 20th-27th.

Polyommatus icarus, Rott., race not identified, I. gen., May 19th-24th. *P. icarus*, Rott., race not identified, II. gen., June 17th-27th. *P. amandus*, Schn., race not identified, May 19th-26th.

Cyaniris semiargus, Rott., race not identified, May 19th-June 4th.

Aricia medon, Hufn., race *subcalida*, Vrtty., I. gen. *subornata*, Vrtty., May 21st-30th. *A. medon*, Hufn., race *subcalida*, Vrtty., II. gen., *subcalida*, June 17th-27th. *A. eumedon*, Esp., race not identified, May 24th-June 4th.

Plebeius argus, L., race *calabrica*, Trti., June 1st-27th. *P. ligurica*, Obth., race not identified, June 17th-23rd.

Lycaenopsis (Celastrina) argiolus, L., race *calidogenita*, Vrtý., June 20th.

Cupido minimus, Fuessl., race *minimus*, May 22nd.

Lampides boeticus, L., race *boeticus*, June 20th.

Callophrys rubi, L., race *virgatus*, Vrtý., May 19th-26th.

Nordmannia ilicis, Esp., race *inornata*, Vrtý., May 19th-22nd.

Colias croceus (edusa), Fourc., race *croceus*, II. gen. *croceus*, June 23rd.

Leptosia sinapis, L., race *bivittata*, Vrtý., I. gen. *lathyri*, Hb., May 19th-21st. *L. sinapis*, L., race *bivittata*, Vrtý., II. gen. *bivittata*, June 17th-27th.

Anthocharis (Euchloë) cardamines, L., race *meridionalis*, Vrtý., May 19th-26th.

Pontia daplidice, L., race *daplidice*, II. gen. *daplidice*, June 23rd.

Pieris napi, L., race *meridionalis*, Rühl, I. gen. *vulgaris*, Vrtý., May 19th-21st. *P. napi*, L., race *meridionalis*, Rühl, II. gen. *meridionalis*, June 21st-27th. *P. rapae*, L., race *rapae*, L., I. gen. *metra*, Steph., May 19th-21st. *P. rapae*, L., race *rapae*, L., II. gen. *aestiva*, Z., June 20th-27th.

Mancipium (Pieris) brassicae, L., race *catoleuca*, Rüb., II. gen. *catoleuca*, May 19th-26th.

Aporia crataegi, L., race not identified, May 19th-June 20th.

Parnassius mnemosyne, L., race *calabra*, Trtí., May 19th-26th.

Papilio machaon, L., race *aestivus*, Z., II. gen. *aestivus*, June 17th.

P. podalirius, L., race *interjecta*, Vrtý., I. gen. *interjecta*, May 19th-22nd.

Coenonympha pamphilus, L., race *australis*, Vrtý., I. gen. *australis*, May 19th-26th. *C. pamphilus*, L., race *australis*, Vrtý., II. gen. *emilyllus*, Vrtý., June 24th-July 5th. *C. arcania*, L., race not identified, I. gen., May 24th-June 20th.

Epinephale jurtina, L., race not identified, May 19th-June 20th.

Melanargia galathea, L., race not identified, June 1st-July 5th. *M. arge*, Sulz., race *turatii*, Rostagno (= *cocuzzana*, Staud.), May 19th-June 1st.

Pararge megera, L., race *megera*, I. gen. *megera*, May 19th-26th.

P. megera, L., race *megera*, II. gen. *megera*, June 20th-July 3rd. *P. maera*, L., race *erdonia*, Fruhst., I. gen. *erdonia* (= *polsensis*, Staud.), May 19th-26th. *P. aegeria*, L., race not identified, II. gen., June 17th.

Satyrus fagi, Scop. (= *hermione*, L.), race *alcyoneformis*, Vrtý., June 17th-27th. *S. circe*, F., race *itala*, Vrtý., June 17th-27th. *S. cordula*, F., race *calabra*, Costa (= *acteina*, Obthr.), June 17th-27th. *S. semele*, L., race not identified, June 23rd.

Limenitis rivularis, Scop. (= *camilla*, auct.), race *rivularis*, I. gen. *rivularis*, June 23rd.

Melitaea didyma, Esp., race *neeraeformis*, Vrtý., I. gen. *neeraeformis*, May 19th-June 27th. *M. trivialis*, Schiff., race not identified, I. gen., May 19th. *M. phoebe*, Knoch, race *tusca*, Vrtý., I. gen. *tusca*, May 19th-26th. *M. cinxia*, L., race *australis*, Vrtý., May 19th-26th. *M. athalia*, Rott., race *obscura*, Vrtý., May 19th-July 5th.

Brenthis daphne, Schiff., race *nikator*, Fruhst., June 1st-20th. *B. euphrosyne*, L., race *apennina*, Stgr., May 19th-26th.

Issoria lathonia, L., race not identified, I. gen. *lathonia* (not possible to identify the race not having collected the other broods), May 19th-June 1st.

Argynnis cydippe, L., race *clarens*, Vrtý., June 21st-27th. *A. aglaia*, L., race *appenninica*, Vrtý., May 24th-June 20th. *A. niobe*, L., race not identified, June 1st-July 5th.

Pyrameis cardui, L., race *universa*, Vrtý., I. gen. *universa*, May 24th-June 4th. *P. atalanta* L., race *atalanta*, May 24th.

Aglais urticae, L., race *turcica*, Stgr., May 24th.

Polygonia egea, Cr., race *egea*, I. gen. *egea*, May 24th. *P. c-album*, L., race *c-album*, II. gen. *hutchinsoni*, Robson, June 17th.

Dr. Verity will publish an account of the races not yet identified. The number of species collected in the brief period of residence in Calabria is remarkable, but the number of individuals is very small; of many species only one or two specimens were collected. The aberrations found in Calabria are also very few:—

A female of *Z. meliloti* wanting the dark pigment on body and wings.

A male of the same species in which the dark band of the hindwings is so much extended as to leave only a small red point in the centre.

A male of *Z. scabiosae* with a red ring on the abdomen.

A male of *Z. ragazzii* with the white spaces much reduced in number and dimensions and the hindwings quite dark.

A male of *P. argus* with extensive fulvous marks on the upperside of the hindwings.

A female of *A. crataegi* with the transparent space at the end of the cell of the forewings extremely broad.

A male of *M. athalia* very dark.

(To be continued.)

New Species of Myrmecophilous Hymenoptera—Proctotrypoidea.

By L. A. BOX, F.Z.S., F.E.S.

The types of the species here described are in Mr. Donisthorpe's collection of myrmecophiles and were taken by him in the nests of the ants mentioned.

CERAPHRONIDÆ.

Lagynodes niger, Kief., **aterior**, var. n.

Male. Length 1·2mm. Alar expanse 2·7mm. Resembles *niger* in the colour being entirely black, the tegument being smooth and shining, the detail of the head and antennæ, the shape and detail of the abdomen, the dividing sutures of the scutellum reaching at their junction in the centre to the posterior edge of the mesonotum, and the radius being distant from the extremity of the wing by two-thirds of its length. It differs in having the wings distinctly blackish or smoky, the scape red only at the base, the rest dark brown, the femora black or fuscous except at the knees, the tibiæ fuscous in the centre and the abdomen without trace of reddish colour.

From nest of *L. fuliginosus* at Woking on September 27th, 1920.

Ceraphron fuliginosi, sp. n.

Female. Length 1mm. Alar expanse 1·8mm. Entirely black. Wings normal, forewings fuscous except at the base and having a somewhat clearer area below the radius, hindwings slightly fuscous. Marginal nervure straight, not thickened so as to form a stigma, the radius half as long again as the marginal nervure. Abdomen not compressed, ovoid and acuminate at the tip, very smooth and shining, devoid of striation at the base. Head and thorax smooth and shining but finely acupunctate and clothed with short fine whitish hairs. Antennæ entirely black, except the scape at the apex and the second joint piceous, with ten

joints, scape nearly a third of the total length, swollen at the base, the second joint nearly twice as long as thick, obconical, funicle gradually thickened from the third joint to the last which is conical, third joint slightly longer than thick, fourth to ninth joints distinctly transverse, tenth joint twice as long as thick. Legs dark brown except the coxæ, the tibiæ at the base and the tarsi, which are reddish. There is a dense fringe of long white hairs on each side of the metapleuræ pointing backwards and covering the sides of the base of the abdomen. Propodeon narrowly margined and having a few deep striations especially obliquely on each side from the base to the inner side of the lateral acuminations, and forming a trapezoidal area in the base of which is the small spiracle.

From the same nest of *L. fuliginosus* at Woking on August 14th, 1920.

DIAPRIIDÆ.

Loxotropa fuliginosi, sp. n.

Female. Length 1·7mm. Antenna 1·1mm. Black, smooth and shining, with a mass of long whitish pubescence on the lateral corners of the pronotum, on the dorsal surface of the petiole and on the metapleuræ. Legs entirely bright orange-red. Antennæ reddish-brown except the club which is black. Antennæ with the scape stout and cylindrical, as long as the five following joints together; second joint obconical, twice as long as thick, third joint longer than thick, gradually thickened from base to apex which is as wide as the second joint, fourth to ninth joints transverse, moniliform, tenth to twelfth joints more than twice as thick as the rest, forming a club which is as long as the scape, tenth and eleventh joints globular, the eleventh distinctly transverse, the twelfth joint tapering to a rounded point, longer than thick. Wings atrophied, reaching just beyond the petiole, the forewing with a pale yellow marginal vein ending in a dark brown knob or stigma and extending to three-fourths the total length of the wing, the part beyond the stigma and immediately below it very pubescent, the rest hyaline and glabrous. Hindwing linear, almost threadlike but slightly wider at the tip and about as long as the forewing. Head wider than the thorax and about as wide as the abdomen, subsquare, wider in front. Mesonotum semicircular but as long as wide at the base. Scutellum with a deep depression in front next to and running into the mesonotum. Propodeon with a raised emargination all round ending in a prolonged blunt point or horn on each side, with a raised ridge in the centre from front to back which is widened basally and raised there to a knob-like point in the centre of the widened boss. The apical margin with a single tooth in the centre. Abdomen more than twice as long as wide, flat above, almost parallel-sided and somewhat truncate at the apex, petiole a little longer than wide, second segment covering at least three-fourths the total length excluding the petiole. All the tibiæ very slender at the base and gradually thickened to the apex.

From the same nest of *L. fuliginosus* at Woking, May 30th, 1920.

PLATYGASTERIDÆ.

Synopeas fuscicola, sp. n.

Female. Length 1·1mm. Alar expanse 2·1mm. Dull black, with white hairs at the base of the mesonotum on each side in a fringe, on each side of the scutellum thinly, on the lateral edges of the propodeon densely, on the metapleuræ all over densely, and on the base of the abdomen above on each side and ventrally densely. Legs and antennæ (except the club which is piceous) bright yellow. Wings, except at the base below the short marginal vein, covered with short dark hairs, almost hyaline. Tegulæ prominent and fuscous. Head transverse, finely and shallowly alveolate, ocelli in a slight curve, wide apart, the outer ocelli very near to the eyes. Pronotum broadly visible from above from one tegula to the other for about the same depth all round. Mesonotum convex, finely rugose, with two parallel striæ from front to back frequently interrupted—like dotted lines—roughly dividing the surface into three equal parts and with a slightly raised knob or pimple rather shining in the centre immediately in front of the scutellum and another similar knob on each side between this and the tegula but nearer the latter and with a row of short striæ between each. The awl-shaped prominence of the scutellum is smooth and shining and viewed sideways it will be seen that the tip

is a sharply pointed horn, pale in colour, below which before reaching the impressed metanotum there is a second but obtuse tooth. The propodeon is divided longitudinally by a broad raised ridge which is smooth and shining and projects behind as a blunt tooth. So much of the rest of the propodeon as is visible is smooth and shining. The large segment of the abdomen which covers more than three-fourths of the whole is smooth and shining, the surface being almost imperceptibly alveolate. The antennæ have the scape long and slender, more than half the length of the funicle, slightly thickened from the base upwards and curved outwardly, having outwardly just before the apex a curved excavation from before the commencement of which springs a long curved hair or bristle reaching to just beyond the end of the joint which is truncate, the second joint obconical and almost as thick as the scape, twice as long as thick, the third joint only half as wide, ovoid and longer than thick, the fourth joint as long as the last, twice as long as thick, cylindrical, the fifth joint the same width, globular, the sixth joint transverse and truncate at the apex, the seventh to tenth joints forming a club slightly thicker than the scape, the seventh subtriangular, longer than thick at the apex, the eighth and ninth cup-shaped, transverse, the tenth joint longer than thick and bluntly rounded at the tip. The hind and mid tibiæ are long and slender, thickened towards the apex, the femora strongly thickened in the middle.

In a nest of *F. fusca* at Barmouth on June 23rd, 1906. See *Ent. Rec.*, 1906, p. 319.

NOTES ON COLLECTING, Etc.

NOTES FROM KENT, MIDDLESEX AND SURREY.—My first hunt this year was in Richmond Park on April 21st. Here I found *Pammene argyrrana* in abundance settled on oak trunks; most trees sheltered three or four and some especially favoured carried nearly a dozen moths. Among the number were two cream coloured specimens as Wilkinson calls them, while Barrett alludes to them as "dirty white." There were a few intermediate between these and the type, and two *P. splendulana* were also noticed. Two days later I found *Ancyliis inornatana* quite plentiful in its old haunt among *Salix fusca* on Barnes Common. Later *Lithocolletis quinqueguttella* also occurred here. At Hindhead on May 13th, several cocoons of *Stigmella* (*Nepticula*) *septembrella* were found in leaves of *Hypericum*. I was surprised to see *Hesperia* (*Syrichthus*) *malvae* at Richmond on May 22nd, as I had never previously seen it there. On the birches I found larvæ of *Salebria* (*Phycis*) *betulae*. The larva spins a slight but quite tough cocoon, to one end of which the pupa is firmly anchored by strong cremastral hooks. The moth on emergence carries a portion of the pupal head case with it, by means of which it forces a hole through the cocoon, and after emergence this part of the pupal shell is found outside the cocoon. It is a trefoil shaped piece which is apparently the top of the head, but as this pupa is of macrotype and breaks up irregularly I was unable to fit the pieces on to any of the pupæ to ascertain their exact position.

At Otford, on the 29th, I found two small pupæ in a head of *Carlina vulgaris*. They had the look of dipterous pupæ, as they were quite without segmental movement, but the lens showed them to be lepidopterous, and at the end of June one of them disclosed a nice specimen of *Parasia carlinella*. On the 31st, I saw four imagines of *Chrysoclysta linneella* on lime trunks in Chiswick, this is the earliest date I have on record. At Orpington, June 19th, *Aphelosetia argentella* was in multitudes for about half a mile along a road side. It would be an exaggeration to say that the grass was white with them, but

there must have been one to every few square inches. When on the wing at dusk they must have presented a picture of fairyland. On an old oak in contrast sat one solitary specimen of *Tinea parasitella*. About this time *Paedisca bilunana* was common on birch stems at Chiswick, *Laverna hellerella* on hawthorn and *Pardia tripunctana* on rose. On June 30th, at Richmond, I saw a few *Penthina corticana*, Hb., among birch, and found a nearly full-grown larva of *Leiocampa dictaeoides*. I took twelve spun up Coleophorid cases for examination of the pupa, but every one of them contained parasites. There were a few *Butalis grandipennis* on Barnes Common, July 7th, they were first noticed there about seventy years ago as recorded in the *Zoologist* of that time. The common must have been a fine hunting ground in those days. *Gelechia pinguinella* was very numerous on the poplar trunks and in fine condition. I also took this species in Chiswick where I had not seen it before. At Wimbledon, mines of *Stigmella salicis* were very common in willow leaves and *Argyresthia goedartella* was quite in its usual abundance. On July 24th I joined the South London Society's excursion to Byfleet, and took a fine specimen of *Abcibaea (Cerostoma) lucella*, which I had long wanted, four larvæ of *Apheloseitia cerusella* in one mine on *Phragmites communis*, all of them produced moths, which emerged after 5 p.m. (G.T.). This seems odd as Mr. P. A. Buxton records that *A. poae*, which feeds on *Glyceria aquatica* in similar situations, emerged between 8 and 9 a.m. The two species, however, belong to different sections of the genus (*Ent. Rec.*, xxviii., p. 38). I was also pleased to get larvæ of *Bucculatrix frangulella* off the *Rhamnus* bushes, they were mostly in their cocoonets changing their skins. The skin does not shrivel up like that of many larvæ, but remains outstretched in the cocoonet just as it was before the larva crept out of it. On the 29th I walked down one of the last yet unmade-up roads in Chiswick and found *Hemimene (Dicerorampha) simpliciana* common and in fine condition, *Artemisia vulgaris* grows in abundance, and it is here that I have taken the larvæ of *Gracilaria omisella* in their bladdery mines. In early August we tried sugar, but it only produced a few of the very common Noctuæ. A few specimens of the once rare *Conchylis smeathmanniana* occurred in our meadow about this time. At Kingsbury on August 28th I found young larvæ of *Coleophora solitariella* in their first cases, and also several empty egg shells. The eggs are laid on the upper surface of the leaf towards the base, close to or in the sulcus that runs down the middle of the leaf. The upright egg is cone-shaped, ribbed with a rather deep depression at the summit. The larva mines through the base of the eggshell into the leaf. In making its first case the larva cuts out elongated pieces of the upper and lower cuticle, avoiding the serrated edge of the leaf. It fastens the newly made case to the under-side of the leaf, and later adds a portion to the tail end of pure white silk. In another place the young larvæ of *C. albitarsella* were also in their first cases, cut out from the leaves of *Glechoma*. In early September *Peronea reticulata (contaminata)* was abundant at Kingsbury in all its forms except *omicron*, which I did not see at all. There was one specimen of the Y-form, with white ground colour, similar to a specimen taken at Bath and I think Mr. Turner also has a white one. There is a good deal of dogwood in the hedges about Kingsbury, but I was surprised to see many mines of *Antispila treitschkiella* in the leaves, as I had never noticed these mines previously. In August,

Cerostoma vitella was quite common in Regent's Park on the elm trunks and I boxed a *Tortrix pronubana* off a window of a house at the foot of Primrose Hill and saw a second one in September. This species still inhabits our garden in Chiswick, where it was quite common this year.—ALFRED SICH, Chiswick. December, 1920.

CURRENT NOTES AND SHORT NOTICES.

The name of Alexander Borisovitch Shelkovnikov, who has done so much to elucidate the fauna and flora of the Transcaucasian steppes, supplied specialists all over Europe with abundant material of all kinds, and lavished the most genial hospitality to men of science of all countries in his beautiful home at Geok Tapa, about half-way between Tiflis and Baku, is well known to readers of our pages. As the most prominent landowner in the district, and the only Christian and educated one, he was elected by his Tatar neighbours, with whom he stood in the most friendly and cordial relationship, to be representative of the district on the Constitutional Assembly for regenerate Russia, which assembly, alas, was stillborn. Inspired by the propaganda of the Bolsheviks and by the pan-Islamic fervour of Enver and his satellites, the local Tatars one day fell upon Shelkovnikov's place in a mass and utterly destroyed it. His splendid vineyards were hacked to pieces, the contents of his cellars, containing three vintages, poured forth to waste, his house and buildings burnt to the ground, and the beautiful park, which he had cultivated so lovingly for twenty years, hacked down. Shelkovnikov succeeded, with considerable difficulty, in escaping alive, together with his wife and family. They dared not go to Tiflis, as Christians were being massacred in the train in that direction, but reached Baku safely. They left that hotbed of terror before it was too late and succeeded eventually in reaching Tiflis, where the host of savants is eking out his existence a completely ruined man.—M.B.

A lady, who recently escaped from Petrograd, has brought the sad news, not absolutely certain, but practically hopelessly so, that Andrei Petrovich Semenov-Tian-Shansky was done to death about two years ago or more by the peasants on his estate in the Riazan Government. The most that British entomologists dare hope is that it is one of his brothers who succumbed.

Andre Petrovich, Hon. F.E.S., was one of the best representatives of Russian Intelligentsia. The son of a gifted and very distinguished father, who was the first to survey the Tian-Shan mountains, in recognition of which the Tsar Alexander II. allowed him to add the title Tian-Shansky for his surname, Andre Petrovich inherited the old Senator's love of natural science and became one of Russia's most distinguished entomologists. He is best known in Britain for his work on Russian Coleoptera, Chrysids and Dermaptera. He was also a first-rate all-round naturalist and a very keen sportsman. No mean poet he translated Horace into delightful Russian verse and had read widely several foreign literatures. Always a stout friend of Great Britain, he was enthusiastic over the war, and expressed the hope that the end would not come until the whole world had declared war on Germany, so that posterity might see plainly that Germany was an outlaw among peoples. He contributed considerably to the press in the British interest and took an active, if somewhat academic, part in

the movement for the amelioration of social conditions in his beloved Russia. With true Russian hospitality, he kept open house for thoughtful men of the varied interests. He was Vice-President of the Russian Entomological Society, which means acting chairman, for the post of president was reserved for one of the Grand Dukes, and he was president of the Zoological Section of the Imperial Russian Geographical Society, an organisation which led a separate existence independently of the mother-body. His death is a very great loss to Palæarctic Entomology.

When at Salonika, I used to receive a cheerful postcard from him every fortnight, till suddenly they ceased, and as I began to miss the characteristic handwriting, I felt that I had lost one of my very best friends.

The same lady reports that A. Kuznetsov, the great authority on Russian Lepidoptera, has succeeded in escaping to Finland.—M.B.

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It is fully anticipated that the Entomological Society will be installed in its new premises, 41, Queen's Gate, South Kensington, by March 25th next at the latest. The Imperial Bureau of Entomology, who will occupy the surplus rooms not at present required by the Society, have already moved in. The further decoration, repairs and alterations (few), which have to be made, are rapidly nearing completion. The removal and re-arrangement of the Society's Library is a matter requiring more time. Already the bookcases and shelving have been transferred and are being refitted and enlarged, much of the new material, bookcases and shelves, having been generously donated to the Society by Dame Alice Godman. Of course during the period of transition it is impossible for Fellows to use the Library, and all books borrowed have been called in. We understand that the large meeting room will be available for scientific meetings at times when it is not required by the Society. It is situated on the first floor, and when fully fitted will seat at least a 100 persons, with ample cloak-room and lavatory accommodation.

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MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m.: 1921, January 19th; Annual Meeting.

The South London Entomological and Natural History Society, *Hibernia* Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

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Myrmecophilous Notes for 1920.

By HORACE DONISTHORPE, F.Z.S., F.E.S., etc.

In 1920 more time was devoted to Coleoptera than to Ants, nevertheless a certain number of observations and discoveries were made, which are recorded here.

FORMICIDAE.

Myrmecina graminicola, Latr.—The colony of this species which I obtained on May 1st, 1910 (see *British Ants*, p. 81, etc.) is still under observation, and in a flourishing condition. For the first time for four years no winged females have been reared, though ♂♂ have been plentiful as usual. A little fighting again took place in March; but did not last long. I have not recorded before that in August, 1919, very serious fighting occurred in this nest, indiscriminately between ♂♂ and del. ♀♀. One ♂ might be attacked by two others, or by two ♀♀, or by a ♂ and ♀, or by one ♂ alone, or one ♀; and the same with one ♀. This lasted for nearly two months, and I was much afraid I should lose the whole colony, as over 70, and perhaps 100, ants were killed off in this way. I cannot explain it, as the colony had plenty of food, and a large brood to attend to. I put a stop to it in the end by punishing any ant or ants who were fighting. They were knocked off their legs with a paint brush, pushed about, rolled over, and shaken up until they appeared to be thoroughly cowed! It is possible that this fighting may have been the cause why no females were reared in 1920, and it will be of interest to see if such ♀♀ will be produced this year (1921), as no fighting to speak of, no ants being killed, occurred last year.

Acanthomyops (Donisthorpea) niger, L.—On March 4th, workers in some numbers from a colony of this ant, nesting at the foot of a gatepost at Putney, were running about in the sun carrying bits of earth, etc.

On July 7th, at Mother Ivy's Bay, N. Cornwall, a fine colony of *A. (D.) niger*, situated under a large flat stone near a stream running from a marsh into the sea, was found to contain very many mermithogynes. These short winged females from this nest (which also contained numerous normal winged ♀♀ and many ♀ and ♂ cocoons, but no ♂♂) are peculiar in themselves, in the fact that nearly every one of them possesses a large oval hole in the mesonotum, about .7mm long and .25mm. broad, the object of which I am quite unable to explain. The gasters of such specimens as were dissected were found to contain one, or two, worms in each. Most of the ants and brood of this colony were taken, and as I knew my colleague Mr. Crawley was working on a paper on mermithogynes, I handed them over to him for investigation and experiment. The only other myrmecophiles present in the nest were *Platyarthrus hoffmanseggii*, Brndt., and *Cyphodierus (= Beckia) albinos*, Nic.

On August 28th marriage flights of *niger* (and also of *A. (C.) flavus* and *Myrmica ruginodis*) took place in the afternoon and evening all over Putney.

Acanthomyops (Chthonolasius) mixtus, Nyl.—On August 11th very many deilated ♀♀ were seen all over the heath at Weybridge; and one winged individual was rescued from the clutches of a *F. sanguinea* ♂. One example was observed entering a hole in the sand

FEBRUARY, 1921.

which sheltered a colony of *A. (D.) alienus*. On digging into this nest, six dealated *mixtus* ♀ ♀ were found to have already established themselves in it.

The colony founding of all the British species of *Acanthomyops* is now well known, and thoroughly established (see *British Ants*, pp. 185, 196-99, 208-10, 215-16, 221-22, 230-33, 239-40). It would therefore seem unnecessary to keep on recording instances in support of facts already well-known; but a recent publication by Mons. R. Stumper—"Zur Kolonie-gründung von *Lasius fuliginosus*" [*Arch. Naturg.* 85 189 (1920)], however, proves that it is still advisable to do so. He found in the summer of 1917 two isolated *fuliginosus* ♀ ♀ in cells, but with no brood, and a third in a cell under a stone which covered a nest of *A. (C.) mixtus*, but not communicating with it. He therefore considers that further investigation is necessary. He mentions the discovery of de Lannoy, and what Emery, Forel, and Wasmann had to say about it, but totally ignores the extensive and conclusive experiments carried out by Crawley and myself, besides the various other records published since our earlier papers, and my book! I propose to republish the whole of the facts on the colony-founding of this ant in a future paper; and possibly in some continental publication.

Formica rufa, L.—This ant was very forward in the south in 1920; on February 18th the colonies at Weybridge were in full activity, building up their nests, going from one to another, carrying their fellows, and massing in numbers on the nests in the sun; dealated ♀ ♀ occur in fair numbers with the ♂ ♂ outside the nests.

On March 21st at Oxshott I found a winged *rufa* ♀ out at some distance from her nest; this is the earliest date on record for either of the winged sexes of this species: April 17th being the earliest former record [see *Brit. Ants* p. 255].

Prenolepis (Nylanderia) longicornis, Latr.—On October 12th this cosmopolitan species was found to be abundant in one of the hot-houses at the Botanic Gardens, Regent's Park. The ♂ ♂ were running about on all the plants and pots, both in and around a large pond in the hot-house. This is the first record for the species in these gardens.

COLEOPTERA.

Atemeles emarginatus var. *nigricollis*, Kr.—A specimen of this variety was found in a nest of *Formica fusca* at Box Hill under a stone on May 4th. As far as I am aware this is only the second time that it has been taken in Britain.

Myrmedonia funesta, Gr.—A specimen was taken running on the ground near an old ash tree at Long Ashton in Somerset, around which a number of *A. (D.) fuliginosus* ♂ ♂ were crawling. This is I believe only the third record for Somersetshire, of this insect.

Claviger testaceus, Preys.—This species occurred in abundance in nests of *A. (C.) flavus* under stones at Box Hill on May 4th, many specimens being in *côp*; and also with the same ant at Mother Ivy's Bay, N. Cornwall, on July 7th. My friend Mr. Keys tells me he has always found *Claviger* to be very rare in Cornwall.

HYMENOPTERA—PROCTOTRYPIDAE.

Lagynodes niger var. *aterior*, Box, *Ceraphron fuliginosi*, Box, *Loxo-*

tropa fuliginosi, Box.—These three insects, which are new to science, were all taken in a nest of *A. (D.) fuliginosus* at Woking on September 27th, August 14th, and May 30th respectively. I am indebted to my friend Mr. L. A. Box for the descriptions of the same (see *antea*, pp. 15-16), who at the same time described a species of *Synopeas* taken by me at Barmouth on June 23rd, 1906, in a nest *F. fusca*, under the name *Synopeas fuscicola*.

BRACONIDAE.

Aspilota nervosa, Hal.—A specimen of this Braconid was taken in the same *fuliginosus* nest as the above mentioned Proctotrypids on September 27th. This is the second time I have taken this species with *fuliginosus*, it having occurred with the ant in question at Darenth Wood in June 1909 [*Ent. Rec.* 22 15 (1910)].

CHALCIDIDAE.

Spalangia erythromera, Först., was taken in the Woking *fuliginosus* nest on September 27th, and also bred on December 10th from some carton and other refuse taken from the nest on the former date, and placed in a small plaster nest. As far as I know there were no ant larvæ present, but plenty of a fat, broad Dipterous larva, which all pupated later. This however proves nothing, as the *Spalangia* larva may leave its host before pupating, and have been present as a pupa in the débris. This conspicuous jet black species is, in any case, most certainly a regular guest of *fuliginosus*. I first took it in Britain with this ant at Wellington College in April, 1906, and bred it in large numbers the same year from a nest of the ant. It has subsequently been taken by me at Darenth Wood, Oxshott, Weybridge and Woking, and always with the same ant, which it will be remembered is also of a jet-black colour.

DIPTERA.

Pseudacteon formicarum, Verrall.—This little fly was captured hovering over ♂ ♂ of *F. sanguinea* at Woking on August 14th. I had dug up a *sanguinea* nest and thrown the earth, etc., on a large white cloth. There were no ants on the cloth, or to be seen, except the *sanguinea* ♂ ♂, and several of the little flies were observed hovering over these ants. It is rather important to emphasise this, as Wasmann in a recent and very valuable paper on this fly [*Biol. Zentralb.* 38 317-29 (1918)] considers it to be only associated with *A. (D.) niger*, as he thinks the ovipositor would not be long enough to reach between the segments of the gasters of larger ants. I have no doubt he is correct in thinking that *niger* is its principal host; but there can be no possible doubt that on this occasion the flies were endeavouring to parasitise the *sanguinea* ♂ ♂, and their behaviour was just the same as I have always noticed, when they have been hovering over *niger*, and other small ♀ ants.

HETEROPTERA.

Pilophorus cinnamopterus, Kirsch.—Larvæ in numbers and some imagoes occurred on fir trees over *rufa* nests at Weybridge on July 16th and August 11th, and *Megacoelum beckeri*, Fieb., larvæ on the former occasion. I had hoped to find out something of the life-history of these two species, and the reason for their association with ants, and for

this purpose I had prepared a very large tray covered with sand with a broad moat of water all round. On it were young oak, birch, and fir trees growing in pots and I had established a nice colony of *Formica rufa* upon it, whose hillock was built up in one corner of the tray. Unfortunately the experiment proved to be a failure; as the bugs and their larvæ, of which I brought home numbers, and put on the young trees, always got into the water, and were drowned.

Alydus calcaratus, L.—Larvæ were seen running in company with *F. rufa* ♂ ♀ at Weybridge on August 11th.

Nabis lativentris, Boh.—At Porthcothan Bay, N. Cornwall, on July 9th, one larva of this bug was swept up in company with ♂ ♀ of *F. fusca* var. *glebaria* and *A. (D.) niger*, and another was taken running over a *niger* nest. It is not generally known that the younger forms of this bug possess spines on the pro- and meso-thorax, and also on the front femora; these spines are entirely lost in the adult stage, and those on the femora are replaced by fine hairs. It is the only one in the genus possessing these peculiarities, which are no doubt connected with its ant-like form. My friend Mr. Ernest Green sent two of the spiny form to the Museum in June, which created quite a flutter at the time. When they were shown to me, I expressed a view that they were larvæ of *Nabis lativentris*, but was told that one could not expect any young form with spines to lose them entirely when adult, etc., etc. I produced similar forms from my cabinet taken with ants, but it was suggested they were a new species to Britain. The larval form figured by Dr. Sharp [*Cambridge Nat. Hist.* 6 556 (1899)] who first called attention to the resemblance to ants, is older and does not possess the spines. Other specimens in my collection are also without them. However, "blessed is he that expecteth little," especially when dealing with ants and myrmecophiles, and the various specimens being submitted to Mr. E. A. Butler, he identified them all as early stages of *N. lativentris*. I swept up a form without spines, and with yellow, instead of white, margins to the abdomen, in company with *Myrmica scabrinodis* ♂ ♀ and dealated ♀ ♀ by the side of a marsh near Chichester on August 17th. Other specimens swept up in the marsh itself, had bright red abdominal borders.

COCCIDAE.

Rippersia europea, New.—Numerous specimens of a Coccid which I felt sure was a species I had not taken before, were found in a nest of *A. (D.) niger* at Stepper Point, N. Cornwall on July 8th, in company with the *Aphis Trama radialis*, Kalt.

Professor Newstead, who kindly named them for me, told me that they were old adult ♀ ♀ full of embryos. He says it is closely related to *Rippersia tomlini*, but is distinguished from old adults of the latter by its smaller size, the large number of gland pores, and the presence of a chitinous scoop-shaped structure of the anal ring. As far as I am aware the insect has only been captured once before in Britain—at Swanage.

ARANEINA.

Tetrilus diversus, Camb.—Egg cases of this spider occurred on the carton itself of the Woking *fuliginosus* nest, and very young, recently hatched spiders were running about on the carton on September 27th

and November 4th. Whether this species is the same as *T. arietinus*, Thor., or not, it is undoubtedly a regular myrmecophile; as is also the latter. I have taken it with this ant in various months (January, April, August, September, November, and December), at Oxshott, Wellington College, Weybridge and Woking; ♀♀ occurring deep in the nest itself. The ♀ evidently lays her eggs on the carton of the nest and I have found egg-cases similarly situated at Weybridge and Oxshott.

It is also probable that the records of *Cryphoeca recisa*, Camb., with ants, really apply to *T. diversus*, as Mr. Hull tells me the true *C. recisa*, Camb., is a synonym of *Tetrilus impudicus*, Simeon, which is non-myrmecophilus.

ACARINA.

Laelaps (Laelaspis) humeratus, Berl., and *Trachyuropoda (Leonardiella) canestriniana*, Berl.—These two mites, which are recorded here for the first time in Britain, were taken by me in a nest of *Tetramorium caespitum* at St. George's Well, N. Cornwall, on July 11th. It is recorded from Italy in ants' nests, and probably with the same host species, as a var. taken in Russia and another in Corsica, were both taken with *Tetramorium caespitum*.

Laelaps (Laelaspis) equitans, Mich.—I have already recorded this species from Porthcothan Bay, and commented on its habits [see *Ent. Rec.* 32 188 (1920)].

Trachyuropoda (Janetiella) troguloides, Can. and Fanz. (= *laminosa*, Berl.), and *Laelaps (Hypoaspis) myrmecophilus*, Berl.—These were taken in ants' nests at Porthcothan Bay on July 8th. The former with *A. (D.) niger*, and the latter with *F. fusca* var. *glebaria*.

Lepidoptera in Peninsular Italy during the year 1920.

By O. QUERCI.

(Continued from page 15.)

While my family collected Lepidoptera in Calabria I was collecting in the mountains of the Garfagnana. I lived in a small peasant's house isolated on the slopes of Monte Sumbra at about an hour's walk from the village of Careggine. The locality seemed very favourable, having large waste lands close to the beech zone (3000-5000ft.). However, I noticed at once that the trees had not produced nuts and that the grass had suffered enough on account of the drought and from the hail-storms which had visited the region during spring.

From June 13th to the 26th, notwithstanding the unfavourable season and frequent showers, I collected the following species:—

Zygaena purpuralis, Brün., race *fiorii*, Costantini. *Z. achilleae*, Esp., race *triptolemus*, Hb. *Z. stoechadis*, Bkh., race *stoechadis*, Bkh. *Z. loniceræ*, Schev., race *vivax*, Vrtý. *Z. transalpina*, Esp., race of transition from *sorrentina*, Stgr., to *altitudinaria*, Trti. *Z. oxytropis*, B. (only two specimens). *Z. carniolica*, Scop. (only two specimens). *Procris statice*, L., race not identified. *P. tenuicornis*, Z., race not identified. *Heodes virgaureæ*, L., race *apennina*, Calb. *Rumicia phlaeas*, L., race *nigrioreus*, Vrtý. *Loweia alciphron*, Rott., race *romanorum*, Fruhst. *Lycaena arion*, L., race not identified. *Agriades thetis*, Rott., race *apenninigena*, Vrtý. *A. hylas*, Esp., race *correpta*,

Vrty. *A. escheri*, Hb., race *altivolans*, Vrty. *Polyommatus icarus*, Rott., race *zelleri*, Vrty., I gen. *zelleri*. *P. amandus*, Schneid., race not identified. *Celastrina semiargus*, Rott., race *porrecta*, Vrty. *Aricia medon*, Hufn., race *pallidefulva*, Vrty., I gen. *subornata*, Vrty. *Plebeius argus*, L., race *apenninica*, Vrty. *Cupido minimus*, Fuessl., race *minimus*, Fuessl. *Callophrys rubi*, L., race *virgatus*, Vrty. *Nordmannia ilicis*, Esp., race *inornata*, Vrty. *N. acaciae*, F., race *italica*, Vrty. *Gonepteryx rhamni*, L., race *transiens*, Vrty., II gen. *secunda*, Vrty. *Colias hyale*, L., race *calida*, Vrty., II gen. *calida*. *C. croceus*, Fourc. (*edusa*, F.), race *croceus*, II gen. *croceus*. *Leptosia sinapis*, L., race *bivittata*, Vrty., II gen. *bivittata*. *Pieris napi*, L., race *vulgaris*, Vrty., I gen. *vulgaris*. *P. rapae*, L., race *rapae*, II gen. *rapae*, L. *Aporia crataegi*, L. (only two specimens). *Coenonympha pamphilus*, L., race *australis*, Vrty., I gen. *australis*. *C. arcanus*, L., race *tenuelimbo*, Vrty., I gen. *tenuelimbo*. *Epinephele jurtina*, L., race not identified. *Erebia epiphron*, Knoch., a new race. *E. stygne*, O., race *etruriae*, Vrty. (= *constantinii*, Trti.). *E. medusa*, F., race *hyperapennina*, Trti. *E. aethiops*, Esp. (only two specimens). *Melanargia galathea*, L. (only two specimens). *Pararge megera*, L., race *megera*, I gen. *megera*. *P. maera*, L., race *apennina*, Vrty., I gen. *apennina*. *Melitaea didyma*, Esp. (only one specimen). *M. athalia*, Rott., race *tenuicola*, Vrty. *Brenthis euphrosyne*, L., race *apennina*, Stgr. *Argynnis aglaia*, L., race *apenninica*, Vrty. *A. niobe*, L., race *apenninica*, Vrty. *A. cydippe*, L., race *clarens*, Vrty. *A. urticae*, L., race *turcica*, Stgr.

These are certainly not all the species which can emerge on the Apuane Alps in the first period, that is in the period preceding the summer pause. Many had certainly missed on account of the excessive drought, and this I deduce from the fact that I only collected a very few individuals of species which are generally common and abundant such as *Z. carniolica*, *C. hyale*, *P. rapae*, *A. crataegi*, *E. jurtina*, *M. galathea*, *M. didyma*.

Amongst the Lepidoptera of Monte Sumbra I only found of note the two specimens of *A. thetis*, ab. *polonus*, Z., mentioned by Dr. Verity in the *Ent. Rec.*, 1920, p. 140.

The emergence of Lepidoptera ceased on June 26th and I continued for some days my useless excursions up the top of Monte Sumbra in search especially of *P. apollo*, but I only saw spoilt specimens of the other species before named, not worth capture.

On July 8th I went to Lucca to meet my wife and daughter on their return from Calabria, and on the 10th of the same month we went to live in the little house on Monte Sumbra waiting for the summer species to emerge at the end of the pause.

From July 10th to 14th we found a few individuals of *A. coridon*, Poda, race *apuanica*, Vrty.; *P. icarus*, Rott., race *zelleri*, Vrty., II gen. *aestivalis*, Tutt; *A. medon*, Hufn., race *pallidefulva*, Vrty., II gen. *pallidefulva*; *P. napi*, race *vulgaris*, Vrty., II gen. *napaeae*, Esp.; *S. fagi*, Scop. (*hermione*, auct.), race not identified; *H. semele*, L. (only one male).

After July 14th began the great emergence of *A. coridon*. All the meadows were full of restless *coridon*. At sunset they assembled in groups on the dried stems, and all around us we saw hundreds of white banners which took flight only on being disturbed by our nets. We could easily choose perfect specimens without useless slaughter

and our catch was of more than 2,500 perfect individuals, but we had certainly examined more than 10,000, among which we only found one male and one female of the aberration *corydonis*, Brgstr., as it is figured by Tutt in *Brit. Butt.*, vol. iv. (1910), plate II., fig. 14.

On July 22nd the emergence of *A. coridon* ceased and we saw thousands of spoilt individuals together with a few individuals of the other species, also spoilt. We had to leave Garfagnana owing to the want of Lepidoptera, and it was lucky for us because the house we inhabited was destroyed by the earthquake of September 7th, and we should certainly have remained till that date if there had been material to collect.

On July 20th Dr. Romei, my son-in-law, came to visit us and he assured us that in the environs of Florence no insect flew and that he had seen none in his long journey from Florence to Careggine. It was evident that the want of insects must depend upon the excessive drought, so my wife and daughter proposed to go to the Bagni di Lucca to collect in the valley of the Camaione river, which descends from the Monte Pratofiorito and falls into the Lima near Ponte-a-Serraglio. They had collected in that locality in August, 1915, and they remembered that in the valley of Camaione the sun only appeared for a few hours during the day and this made them hope that the Lepidoptera had been able to save themselves from destruction.

I went to the valley of the Camaione and perceived that something was flying there. I found lodgings at Bagni di Lucca and returned to Careggine to take my family.

Before leaving Monte Sumbra my wife and I made a last excursion to it, feeling certain that in so suitable a locality the *P. apollo* could not be wanting. On our return from the Sumbra (5000 ft.) we saw *P. apollo* flying in a valley below, which was rather moist, and we descended to it and were able to capture several specimens very much spoilt and one male only in good condition.

As there was no more hope of collecting even *P. apollo* we left the Garfagnana to go to Bagni di Lucca, whilst my son-in-law left for the Monti Sibillini in the Marche.

During the month of August in the valley of the Camaione (800ft.) we found all the species which we had collected there in 1915.

Nisoniades tages, L., race *clarus*, Carad., II. gen. *clarus*. *Erynnis alceae*, Esp., race *australis*, Z., II. gen. *australis*. *E. altheae*, Hb., race *australiformis*, Vrty., II. gen. *australiformis*. *Hesperia armoricana*, Obth., race *fulvoinspersa*, Vrty., II. gen. *fulvoinspersa*. *H. onopordi*, Ramb., race *fulvotincta*, Vrty., II. gen. *fulvotincta*. *H. malvoides*, Elw. and Edw., race *pseudomalvae*, Vrty., II. gen. *malvoides*. *Powellia sao*, Hb., race *gracilis*, Vrty., II. gen. *gracilis*. *Urbicula comma*, L., race *apennina*, Rost. *Augiades sylvanus*, Esp., race *sylvanus*, II. gen. *minuta*, Vrty. *R. phlaeas*, L., race *nigrioreleus*, Vrty., II. gen. *nigrioreleus*. *L. doris*, Hufn., race *italorum*, Vrty., II. gen. *italorum*. *L. arion*, L., race not identified. *Scolitantides baton*, Bgstr., race *baton*, II. gen. *obscura*, Vrty. *A. coridon*, Poda, race *superapennina*, Vrty. *A. thetis*, Rott., race *etrusca*, Vrty., II. gen. *etrusca*. *P. meleager*, Esp., race *macra*, Vrty. *P. icarus*, Rott., race *zelleri*, Vrty., II. gen. *aestivalis*, Tutt. *A. medon*, Hufn., race *pallidefulva*, Vrty., II. gen. *pallidefulva*. *P. argus*, L., race *apenninicola*, Vrty. *P. idas*, L. (= *argyrognomon*, Bgstr.), race *apenninophyla*, Vrty. *Everes alcetas*, Hoff. (= *coretas*, O.), race *alcetas*.

S. telicanus, Lang., race *telicanus*. *L. boeticus*, L., race *boeticus*. *H. lucina*, L., race *lucina*. *C. croceus*, Fourc., race *croceus*, II. gen. *croceus*. *L. sinapis*, L., race *bivittata*, Vrtý., II. gen. *bivittata*. *Pontia daplidice*, L., race *daplidice*, II. gen. *daplidice*. *P. napi*, L., race *vulgaris*, Vrtý., II. gen. *napaeae*, Esp. *P. rapae*, L., race *rapae*, II. gen. *rapae* (= *aestivus*, Vrtý., and *aestiva*, Stauder). *P. brassicae*, L., race *catoleuca*, Rüb., II. gen. *catoleuca*. *Iphiclidides podalirius*, L., race *zancleus*, Z., II. gen. *zancleus*. *C. pamphilus*, L., race *australis*, Vrtý., II. gen. *emilyllus*, Vrtý. *C. arcanus*, L., race *tenuelimbo*, Vrtý., II. gen. *gracilis*, Vrtý. *Pyronia tithonus*, L., race *etrusca*, Vrtý. *Pararge megera*, L., race *megera*, II. gen. *filipluma*, Ball. *P. maera*, L., race *apennina*, Vrtý., II. gen. *apennina*. *P. aegeria*, L., race *italica*, Vrtý., II. gen. not identified. *Enodia dryas*, Scop., race *julianus*, Stauder. *S. statilinus*, Hufn., race *intermedia*, Vrtý. *Limenitis rivularis*, Scop. (= *camilla*, auct.), race *rivularis*, II. gen. *rivularis*. *M. didyma*, Esp., race *protea*, Vrtý., II. gen. *caldaria*, Vrtý. *M. phoebe*, Knoch, race *emipauper*, Vrtý., II. gen. *emipauper*. *M. athalia*, Rott., race *tenuis*, Vrtý. *B. dia*, L., race *laetior*, Vrtý., II. gen. *flavens*, Vrtý. *Issoria lathonia*, L., race *emiflorens*, Vrtý., II. gen. *emiflorens*. *A. cydippe*, L., race *clarens*, Vrtý. *Dryas paphia*, L., race *magnifica*, Vrtý. *P. cardui*, L., race *universa*, Vrtý. *P. atalanta*, L., race *atalanta*. *A. urticae*, L., race *turcica*, Stgr., II. gen. *turcica*. *P. c-album*, L., race *hutchinsoni*, Robson, I. gen. *hutchinsoni*. *P. egea*, Cr., race *egea*, I. gen. *egea*.

The species which had most felt the adverse season were those of the *Lycaenidi* tribe: *S. baton*, *A. thetis*, *P. icarus*, *A. medon*, *P. argus*, *P. idas*, *E. alcetas*, *R. telicanus*, *L. boeticus* emerged in very small numbers, and the individuals were very small, some having a wing expansion of only a quarter of the normal size.

We only took one spoilt specimen of *A. coridon* which had no doubt come from the overhanging summit of Prato Fiorito where the species is common. The *A. coridon* is never found in peninsular Italy below 2000ft.; only *A. arragonensis* is found in the plain, but in the Prato Fiorito mountain, as also in the Apuane Alps, the *A. arragonensis* has never been found, nor has *A. thersites*.

In the *H. armoricanus* and *H. onopordi* the colouring of the under-side is intensely fulvous; these are amongst the most characteristic of the *fulvoinspersa* and *fulcotincta* of Verity.

At the end of August all the emergences ceased in the valley of Camaione. In the neighbouring valleys, too much exposed to the solar rays, there was absolutely nothing. It was notable that in 1915 the valley of the Fegana stream was found full of *A. coridon*, race *superapennina*, and of individuals of a beautiful race of *P. idas*, whilst this year I went to it three times and covered about 90 miles on a bicycle without seeing any Lepidoptera either in the valley of the Fegana, or in the whole journey on the roads covered with dust which smothered all vegetation.

Besides the *Rhopalocera* several tardy specimens of *Z. stoechadis* were found in the valley of Camaione.

On August 27th I returned to Florence to see if the summer pause had come to an end in the Pian di Mugnone, but no insect was flying in the country burnt up by the heat and drought. My family preferred, therefore, to remain at Bagni di Lucca.

In the second half of the month of July, my friend, Lieutenant

Mario Marchi, collected butterflies for me on the Monte Giovi above Fiesole. There he found abundantly *A. coridon*, race *apennina*, Z., and in the first days of August also some individuals of the like species *A. arragonensis* (Gerh.), Vrtty., race *florentina*, Vrtty., II gen. *altera*, Vrtty. Of other species he only saw *S. fagi*, Scop. (= *hermione*, auct.), *C. croceus* (*edusa*) and *L. rivularis* (*camilla*).

From July 24th till the end of October, my friend, Lelio Misirocchi, who was spending his holidays in the island of Elba, made some entomological researches. At first he found many spoilt individuals of *S. statilius*, *H. neomiris*, *H. semele*, race *aristaeus*, *D. pandora*; afterwards, at the beginning of August, when the second brood ought to emerge of *C. corinna*, race *elbana*, *P. manni* and *Charaxes jasius*, every insect disappeared entirely.

(To be concluded.)

Butterflies of Gilan, N.W. Persia.

By P. A. BUXTON, M.A., F.E.S.

The southern end of the Caspian Sea is fringed by forest, which stretches without any break from near Lenkoran, in the Transcaucasian republic of Azerbaijan, to Asterabad, in N.E. Persia. The greater part of the forest lies in Persia, in the provinces of Gilan and Mazandaran. The forest grows between the Caspian Sea and the Elburz mountains, and stretches from sea level (that is to say, from some 80 feet below mean sea level) to about 5,000-6,000 feet on the northern slopes of the Elburz; the width of the forest, from the sea shore to tree-line, is between thirty and sixty miles; it is provided with a heavy rainfall distributed through every month of the year.

Apart from this forest, Persia consists of a high, semi-desert tableland crossed by many ranges of rocky mountains, and the contrast between the fauna and flora of forest and plateau is extremely clearly marked.

I do not feel competent to deal with the fauna of the plateau, and will only say that it consists of genera and species well known, most of them, as characteristic of the great desert belt, which extends from Morocco, through Egypt and Syria, to Persia, Turkestan and the Gobi. My object in publishing this very incomplete list of the butterflies of the great forest is to show how entirely the fauna of this region differs from that of the stony plateau; even my few captures are of considerable interest, for much less is known of the fauna of Gilan than of that of most parts of Persia.

I was stationed in Resht and in Enzeli, both of them on the level of the Caspian Sea, from January to July, 1919.

During the winter we were free to move in any direction, but the advent of spring (and of insects) coincided with the outbreak of a minute, but troublesome war with some forest tribes, and from March onwards our movements were limited. At the end of June I went by sea to Astara, on the frontier between Persia and Azarbaijan, and returned, mostly by road, along the coast till I reached Enzeli.

Furtunately for me, Le Cerf (1913) has recently published a resumé of our present knowledge of the Persian butterflies. He has added considerably to the list, and under each species records its status in Persia, so far as it is known at present. His paper and bibliography are invaluable.

Specimens of several of the more interesting species have been deposited in the British Museum.

Pieris (Ganoris) brassicae, L.—February 25th, Resht; May 28th, June 6th, Enzeli, single specimens. I made a point of trying to catch every "white" I saw, and believe this species was uncommon. It is probably confined to the forest region, so far as Persia is concerned; all records to date suggest this.

Pieris napi, L.—One female, June 30th, Enzeli. This also appeared to be rare. The underside is entirely unveined, the dark tip of the forewing (upperside) is continued down the termen, and is united to the upper spot by black lines passing along two nervures; black scaling along the marginal termination of the nervures of the upperside, hindwing, is well marked.

Pieris rapae, L. var. *crucivora*, Btlr.—June 6th-30th. A long series of both sexes, Enzeli. This is by far my most interesting capture; the specimens cannot be distinguished from *crucivora* from China and Japan, a race which has been recorded from localities in Western China, but never, I think, further west than that. "*P. rapae*" was recorded by Ménétriers (1832) from Lenkoran, which is close to, but not in, the great forest, but I think the species has not yet been recorded in any form from the afforested provinces Gilan and Mazandaran. The specimens vary considerably, but the dusky scaling along the basal half of the costa is always considerable in both sexes; in the females it may be so extended as to involve the whole basal third, or half, of the wing, and to appear as a faint cloud uniting the apical mark to the two post-discal spots. In females the dark tip is often so suffused with white scales as to be broadly grey all along its costal side.

The males vary in expanse, 52mm.-62mm.; the females, 60mm.-64mm. It is remarkable that this species was never taken till June 6th; I do not think an earlier brood can have been overlooked. The insects were commoner in the woods than in gardens, and flew low over the ground in open places where flowers grow. They were more easy to catch than the ordinary form of *rapae* generally is. Dr. F. A. Dixey has been good enough to examine my specimens: he agrees that they cannot be separated from *crucivora* from the Far East.

Anthocharis gruneri, H. var. *armeniaca*, Christ.—March 27th, Menjil, 3,000ft. Males were common in a gorge above Menjil, among thick bushes and spring flowers. The country round Menjil is stony desert, and for that reason I have not included my captures in this paper. On this particular day I walked far enough to cross the extremely sharp line which separates desert and woodland, and in the woodland I obtained this species.

Le Cerf records "*Anthocharis cardamines*, L. var. *phoenissa*, Kalchb. f. *umbrosa*, Culot," from Teng-rir (I am unable to locate this place), and remarks that its racial characters give it somewhat the appearance of some forms of *A. gruneri*, H.-S. My specimen, however, is, without doubt, *A. gruneri* var. *armeniaca*.

Gonepteryx rhamni, L.—February 18th-March 20th, Resht. Both sexes in worn condition. All records given by Le Cerf suggest that this is a species confined in Persia to the extreme north, except for an old record of Kollar from "S. Persia." This is possibly due to some error.

Colias croceus, Fourcr. (*edusa*, Fab.).—May-June, Enzeli. Common in open spaces, and on the sandhills which fringe the sea. Var. *helice* was not at all uncommon in June.

Epinephele jurtina, L. (*janira*, L.) var. *ghilanica*, Le Cerf.—June 6th-30th (males), June 21st-July 4th (females), Enzeli. This beautiful race was abundant at Enzeli, flying in the depth of the forest more often than in open glades. The males visited bramble blossom. Le Cerf's type came from "Sia-Khâni" (alt. 6,000ft.), and he received specimens from various places, all on the northern slopes of the Elburz, between June and July 28th. My specimens, which have been compared with the original series by Le Cerf himself, show that specimens from below mean sea level differ not at all from those from 6,000ft. The race, in fact, is characteristic of the forest, at whatever altitude, and differs in numerous characters, including genitalia from the races of the stony plateau.

Vanessa io, L.—February 19th-to March 20th, Resht.

Pyrameis atalanta, L.—February 19th-March 20th, Resht.

These two species are confined in Persia, so far as we know, to the province of Gilan (and Mazandaran probably). *P. atalanta*, however, occurs in Baghdad.

Pyrameis cardui, L.—This species was abundant at Enzeli throughout the spring and early summer. I have already (1920) recorded that in the spring larvæ were being used by sparrows to feed their young. The larvæ fed on many low plants, principally *Gnaphalium* sp.

Argynnis paphia, L.—Early July, Enzeli, and Tula Rud, N.W. of Enzeli, in the Persian Talish. The specimens are large (σ 78mm., ♀ 80mm.), and in the British Museum are two from Lenkoran (Christoph coll.), σ 77mm., ♀ 80mm. This species also appears to be confined in Persia to the Caspian littoral. It was common and freshly emerged in the Talish at sea level, both sexes visiting bramble blossom.

Everes argiades, Pall.—June 3rd 1 σ , 3 ♀ , Enzeli. It seems useless to attempt to refer these few specimens to any of the races which have been described; it is a pity that more were not obtained. The male measures 27mm., the females 30mm., 30.5mm., 31mm. There are no Persian records, so far as I know, except from the Caspian provinces.

Celastrina argiolus, L.—March 30th, 1 σ , Menjil (in a thickly-wooded gorge). June 30th-early July, σ σ , Enzeli and Tula Rud, Talish. July 9th, ♀ ♀ , Tula Rud, Talish.

This series differs from any local race in the British Museum; the essential characters are that in both sexes on the underside the discal spots are not abnormally conspicuous; the post-discal spots of forewing and hindwing are large and very dark, and the sub-terminal V-shaped marks, which are often hardly visible in European specimens, are very large, and tend to coalesce to form an irregular subterminal band on the forewing, and to a less extent on the hindwing. The underside is similar in colour to that of British specimens, except for the lack of blue scaling at the base of the wing. The colour of the upperside (male) tends rather to violet than to blue; in the females the black tips are enlarged so as to include the whole costa from the base and the whole terminal third of the forewing; the black

scaling of the hindwings covers everything except the disc. The fringes (♂ and ♀) are very indistinctly chequered. The var. *hypo-leuca*, Kollar, described from S.W. Persia is, as one would expect, entirely different; this race appears to be widely distributed in the Middle East; the underside is marked by the smallness or obsolescence of all the spots. I always found *C. argiolus* among thick trees or thick bushes. It was generally found in very shady places, so dense with trees that one could barely move, flying low and visiting the flowers of *Stachys*. I never saw it flying high as it does in England, or visiting holly bushes, which were common.

Polyommatus icarus, Rott.—April 20th-24th, June 8th-30th, Enzeli. These specimens resemble *P. icarus*, from Britain, except in the ground colour of the underside of the males, which is very nearly white in most specimens, and in the post-discal spots of both wings, which are very large in both sexes. The upperside of the females is on the average very blue. The race generally known as "*persica*, Bienert," is that of the Persian plateau; Tutt has shown that Bienert's name *persica* can only apply to a rare aberration, which is of no geographical significance, and it appears that the plateau race referred to as *persica*, Bien., by many authors from Butler to Le Cerf should be called *fugitiva*, Butler; a number of races have been described from Chitral, Yarkand, etc., and the synonymy will be uncertain till much more material is forthcoming from Middle Asia. For our purpose it suffices that the race from the Caspian forests is very close to the typical *icarus*, while that from the bare plateau is, at any rate, fairly similar to the races of other high-lying, barren parts of Western and Central Asia.

Angiades sylvanus, Esp., var. *hyrcanus*, Christoph.—June 20th-30th, ♂ ♀, Enzeli. In these two specimens the extent of the dark hind-margins of the wings is slightly less than in Christoph's types (Elwes coll.) in the British Museum, but they are much closer to those specimens than to any others. The ♂ type is labelled "7.8.73, Asterabad," the ♀ "Asterabad." Christoph gives "Lenkoran, Astrabad," as the typical localities. Le Cerf erroneously says "Demavend, *loc. orig.*" So far as we know then, this well-marked race is peculiar to the great forest, and is found from end to end of it.

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SCIENTIFIC NOTES AND OBSERVATIONS.

OVUM AND FIRST CASE OF *COLKOPHORA IBIPENNELLA*, STT.—The species here in question is certainly Stainton's *ibipennella*, a birch feeder, but I do not believe that it is the *ibipennella* of Zeller, which is

an oak feeder and is probably the same species that Scott later described as *ardeapennella*. Stainton's insect is probably the *betulella* of Heinemann. These white Coleophorids, whose larvæ make silken pistol cases, do not yet appear to be well understood. The ovum then of Stainton's species is usually laid on the underside of a birch leaf away from the ribs, and is when newly laid deep ochreous. This colour only alters by becoming slightly greyer before the larva escapes. The upright egg is nipple shaped, widest at the base, where it measures about 0.36mm. The walls slope upwards to the somewhat flattened apex. The height measures 0.18mm. or a little more as the eggs vary in size. The micropylar area lies in a hollow at the apex; there are usually seven somewhat pear-shaped cells forming the rosette. There are fifteen to seventeen broad rather flattened ribs running up the walls of the egg almost from the base to the apex. These become attenuated as they pass over the rim of the micropylar basin, while a few of them even reach the cells of the rosette. In some of the eighteen ova under observation, there were some very fine dark lines encircling the walls at right angles to the ribs. These eggs were laid in the latter part of July, 1920. In proportion this egg is higher than that of *C. laricella*, about the same height as that of *riminetella*, but considerably lower than those of either *lineolea* or *gryphipennella*.

The weather was not very genial and the eggs took nearly three weeks before hatching. The larva bores through the base of the egg shell into the leaf and commences to mine. In all the Coleophorids that I had previously had under observation at this stage the larva passed its first stadium in the mine, and after changing its skin it cut out its first case. With *ibipennella*, Stt., the procedure is quite different. After mining out a small space, the larva cuts a circular hole out of the lower cuticle of the leaf and through this it deposits its excrement in a conical heap on the surface of the leaf, taking care to keep the grains together by means of its own silk. Mixed with this is usually some vegetable debris, probably obtained when the above-mentioned hole was cut out. In a comparatively short time this cone of excrement and silk becomes elongated and the larva, getting inside it, detaches it from its moorings, and thus its case is formed. It then walks off and commences a fresh mine in the usual manner. The case is from 1 to .75 mm. long and about 0.5 mm. in diameter. It has a greyish ground colour, but is very thickly covered with black dots. Two days after hatching one larva had already made its case and on the third day there were eight cases. As soon as the larva begins a fresh mine it also begins adding white silk to the mouth end of its case. The larva continues this process, and also enlarges the diameter of the case by adding white silk beneath, until in three or four weeks from the time of hatching (probably sooner when in the open) a miniature *ibipennella* case is completed. It is curved and has the anal opening not at the end but underneath. It now rests on the leaf with both ends touching the surface. In this case the larva passes the winter, firmly fastened to a twig, usually just above a leaf bud. This strikingly simple and economic method of case-making is in strong contrast to the more laborious process of cutting out two cuticles of a leaf and joining them with silk. Eleven days after hatching the larvæ were again provided with fresh sprays of birch, and when I again saw them a week later

the cases were all at rest on unmined parts of the leaves. I think the larvæ were then undergoing their first ecdysis. The larvæ continued to mine small spaces in the leaves, not eating the surface of the leaf as they do after hibernation. In the middle of September I set them free on a birch in the garden. I have only come across one reference to this method of case construction, it occurs in a paper by Dr. Ottmar Hofmann, who states that he saw the larvæ of *C. musculella* and *C. saponariella* commencing their cases by forming a cone of white silk outside the mine, and he suggests *C. vitisella*, the species of which he is writing, has a similar habit. (*Stett. Ent. Zeit.*, 1869, p. 113). The first two species he mentions, as above, make silken cases, but not of the pistol shape adopted by *ibipennella* and its allies.—ALFRED SICH, Chiswick.

NOTES ON COLLECTING, Etc.

LARVA FOUND IN A BARREL OF CANADIAN APPLES.—On November 17th a friend of mine who keeps a greengrocer's shop, brought me a living larva of what appears to be one of the tiger-moth family. He had found it in a barrel of Canadian apples. It was rolled up in a ring and appeared sluggish, but when I brought it into the warm house it appeared to revive and began to walk round the zinc larva box in which I had placed it, I put in several sorts of low growing plants, but it did not seem to take any notice of them; I also put in a slice of apple on which it at once got and appeared to imbibe the juice from the fresh cut surface. The larva is about $1\frac{7}{8}$ inch, and much like *A. caja* larva in appearance, but is rather differently coloured. The first two-fifths is coloured black, including the head, the next two-fifths is chestnut coloured and the last fifth is also black, it looks a regular "black and tan." The hair is not so long and sleek as that of *A. caja*. It is set on in tufts but close together, like the hair in a scrubbing brush, in fact it looks like a *caja* larva that has been to the barber and had its hair cut. I expect it will hibernate, but I hope to get it through to the imago, so that the species can be determined.—WILLIAM DAWS, 39, Wood Street, Mansfield, Notts.

[The species is probably *Pyrpharcticus isabella*, a common species in Canada and the United States. It hibernates in the larval stage under logs or loose bark, and after brief activity in spring pupates in a frail cocoon. It feeds on low bushes, blackberry, raspberry, etc.—HY. J. T.].

RECORDS.—I see that in July, 1918, Mr. Donisthorpe gives the aberrations of *Coccinella 11-punctata*, but gives no British locality for ab. *tamaricis*, Weise. On referring to my series I find two specimens which come under this head, and it might therefore be worth recording them. Both were taken at Gullane (1) on May 27th, 1915, and (2) on November 10th, 1905, the latter with large spots, and would have taken little to convert it into ab. *boreolitoralis*.

Pararge aegeria race *egerides* is pretty generally distributed in Somerset, but I have never seen it in such great numbers as I have seen *P. megera*. The specimens were notably large, one female measuring 28·25 mm. from the centre of the thorax to the tip of the wing, was taken at Weston-super-Mare on July 2nd, 1920. My

friend, Col. T. Jermyn, with whom I was collecting, tells me that he has seen other large specimens in the same wood.

Pieris napi.—On May 2nd, 1920, I took a male at Wembdon near Bridgewater with the right forewing of a different tint from the other three wings, and with the black markings indicated by a pale ochreous brown in strong contrast to the left forewing which is normally grey tipped.

Donacia sericea, L.—On December 26th, 1905, I took two specimens of this beetle alive at the Lead Mines, Priddy, near Wells, Somerset, surely an unusual date to dredge this summer beetle from a pond.—R. LONG, The Grove, Wembdon, Bridgewater.

MELITAEAE ATHALIA AND PLUSIA MONETA IN SOMERSET.—I had the good fortune to capture two specimens of *Melitaea athalia* in a locality some 1,200 ft. above sea level and within 10 miles of Minehead, on June 16th, 1919. I understand that this is a new record for the county. I have also to note that I netted three specimens of *Plusia moneta* in my garden between June 21st and July 2nd, 1919. So far as I can learn this is the most westerly locality for this insect in Somerset.—J. F. BIRD, Alcombe Côte, Minehead, Somerset.

NOTES ON COCCINELLIDAE TAKEN IN 1920.—It will be of interest perhaps to record the following captures of interesting *Coccinellidae* in Surrey during the past year.

1. *C. 10-punctata*, L., var. *confluens*, Haw.—I was fortunate enough to take a single specimen of this striking aberration while beating elders in May at Ashstead, Surrey. This form has been described in vol. vi., Fowler and Donisthorpe, and is also figured at pl. 12, fig. 7 in the same volume, where a misprint occurs in the date 1807, which should be 1812. The original description by Haworth in the *Trans. Ent. Soc. Lond.*, 1812, vol. 1, p. 278, is as follows:—

“*B. confluens*, thoracis maculis septem

“confluentibus maculisque tribus centralioribus

“elytrorum, valde confluentibus in maculam

“magnam bilobatam puncto rubro relicto,

“earum medio”

This Ladybird is evidently rare, as I can find records only of its having been taken by the Rev. T. Shrimshire, who sent his specimen to Haworth to name, and in 1909 by Mr. Horace St. John Donisthorpe at Darenth Wood (*Ent. Rec.* xxi., 1909, p. 136), previous to my capture in May last. I may add that I have also taken four specimens, all exhibiting the same marking on the elytra, but lacking the confluent spots on the thorax, which appear to be the crucial test for this aberration. I have compared my specimen with the one in Mr. Donisthorpe's collection and I find mine in every respect identical with his, except that mine proves to be larger, while the “red spot” in the centre of the “lobed patch” is also much larger. Mr. Donisthorpe confirms my identification.

2. *C. 7-punctata*, L., ab. *5-notata*, Haw.—In February my brother, Mr. S. C. Leman, while sweeping furze at Oxshott took this aberration, in which the 2nd spot is missing. The original description is to be found in the *Trans. Ent. Soc. London*, 1812, vol. 1, pp. 270-1, and is as under:—

"*B. 5-notata*. Omnibus priore (*C. 7-punctata*, L.)
 "convenit, nisi absentia punctorum duorum medio
 "dorsi, varietas rarissima apud Nordovicum
 "capta, communicavit amicus Dom. J. Hooker.
 "Entomologus assiduus."

Aberrations of *C. 7-punctata*, L., are admittedly very rare, and though I have examined many hundreds of this species, beyond minor variations in size and position of the normal spots, I have not succeeded in taking any other variety. Mr. Donisthorpe appears to have had the same experience with this species at Barton Mills in 1917 where he found it in great quantities on young firs (*Ent. Rec.*, xxx., No. 2, Feb., 1918, p. 29).

Weise describes a new aberration of his own with five spots under the name of *v. externepunctata* as follows:—

"dd. P. 1, 3, $\frac{1}{2}$ *v. externepunctata*"

Ws. B.T. 1879, p. 107.

but his aberration is clearly a synonym of *ab. 5-notata*, Haw.

Ganglbauer follows Weise.—G. B. C. LEMAN.

REAPPEARANCE OF *ANTHONOMUS BRITANNUS*, DESBR., IN SURREY.—On April 3rd, 1920, my father, Mr. G. C. Leman, made this rare capture while beating trees and furze at Bookham, over that area of the common which lies beyond the railway bridge on the upside of the railway, but he cannot state definitely from what particular tree he obtained this solitary specimen, which is in my collection.

I submitted this specimen to Mr. Horace St. John Donisthorpe, who has always most kindly helped me in my identifications, and he at once recognised that it was an interesting find and could only be referred to this rare species, but, in view of the doubts expressed in Fowler's *Coleoptera*, vol. v., pp. 319-20, on this species being indigenous in this country, he was good enough to send the specimen to his confrère, Monsieur Paul de Peyerimhoff, of Algiers, who subsequently returned it to Mr. Donisthorpe, confirming the latter's identification, with the following note:—

"*Anth. britannus*, Desbr.

"(rostre court, mat-taille petite)."

It may be of interest also to record that in the same month I took solitary specimens of *Anth. rosinae*, Des Goz., at Ashted Manor and of *Anth. cherrolati*, Desbr., at Bookham, both of which have been identified for me by Mr. Donisthorpe.—G. B. C. LEMAN.

A NEW ABERRATION OF *SELIDOSOMA PLUMARIA* (*ERICETARIA*).—On page 74 of the *Ent. Record*, vol. xxxi. (1919), Mr. Thomas Greer of Stewartstown, Tyrone, Ireland, describes a melanic aberration of *Selidosoma plumaria* (*ericetaria*) under the name *fumosa*. At the same time he announces "a form leading up to this dark type, with all the wings streaked with blackish." Of this latter form Mr. Greer has kindly forwarded me an example. It is a male of the average size of the Irish races which, so far as I know of the species, are slightly smaller than the English and Continental races. The ground colour so far as it is seen lies in irregular patches and streaks not symmetrical on the two wings, and lighter in shade than in the ordinary males, in fact more of the ground colour of the female with a suspicion of yellow

in it. The marginal band of the wings is deeper in general coloration, certainly on the black side of brown, with somewhat lighter clouds in it, while towards the anal angle of the hindwings about half this band is practically wanting, or very ill-defined. The central, transverse, narrow band of the forewing is of the same blackish-brown, but ill-defined, irregularly and obscurely extended especially on the right forewing and towards the inner margin of both forewings. Across and on the disc of all the wings this black marking is scattered mainly in irregular, ill-defined streaks, those of the hindwings being fewer and wider, the left hindwing having the costal half more uniformly clouded and the inner marginal half comparatively clear of this streaking and clouding. I suggest for this recurrent form the name *intermedia-fumosa*.—HY. J. TURNER.

CURRENT NOTES AND SHORT NOTICES.

The Verrall Supper took place in its old quarters, the Holborn Restaurant, on January 18th, when nearly a hundred and twenty guests sat down after a pleasant hour in the famous "Entomological Salon." Among those present were B. W. Adkin, R. Adkin, H. W. Andrews, E. B. Ashby, S. R. Ashby, F. Balfour-Browne, G. Bethell, G. T. Bethune-Baker, K. G. Blair, F. Bouskell, L. A. Box, H. Britten, P. A. Buxton, E. C. Bedwell, A. Cant, F. B. Carr, Prof. J. W. Carr, G. C. Champion, Dr. E. A. Cockayne, J. E. Collin, J. Collins, C. W. Colthrup, Col. Monekton-Copeman, Major P. M. Cottam, Capt. Crocker, B. D. Cummings, A. W. Dods, H. Donisthorpe, J. H. Durrant, F. M. Edelsten, F. W. Edwards, S. Edwards, H. T. Elwes, G. E. Frisby, F. W. Frohawk, J. C. F. Fryer, Dr. C. J. Gahan, Lachlan Gibb, C. F. Gimmingham, E. E. Green, T. H. L. Grosvenor, T. W. Hall, H. M. Hallett, A. H. Hamm, B. S. Harwood, P. H. Harwood, Dr. D. Hunter, Prof. Image, Dr. Imms, Dr. Harvey Jackson, P. H. Jackson, O. E. Janson, A. H. Jones, Dr. K. Jordan, T. W. Kirkpatrick, F. Laing, G. E. B. Leman, G. C. Leman, R. W. Lloyd, W. J. Lucas, G. E. Lisle, H. Main, W. Mansbridge, A. W. Mera, Prof. Matsumira, Rev. F. D. Morice, Dr. S. A. Neave, L. W. Newman, Col. C. G. Nurse, F. A. Oldaker, H. E. Page, H. M. Peebles, J. Peed, Col. H. D. Peile, F. N. Pierce, G. T. Porritt, Prof. E. B. Poulton, R. A. R. Priske, L. B. Prout, N. D. Riley, H. Rowland-Brown, Lord Rothschild, W. Schmassmann, H. Scott, V. E. Shaw, W. G. Sheldon, R. South, R. Stenton, E. Step, A. Sich, W. H. Tams, Rev. A. Thornley, A. E. Tonge, H. J. Turner, C. J. Wainwright, Comm. J. J. Walker, Rev. J. Waterston, Christopher Whall, Rev. G. Wheeler, C. L. Withycombe, etc.

On February 2nd the Entomological Society, London, met for the last time in their old rooms at Chandos Street. The next meeting will be held at the new premises, 41, Queen's Gate, S. Kensington, opposite the Western end of the Natural History Museum and readily accessible from the Gloucester Road and S. Kensington Stations of the Metropolitan and Tube Railways.

We are pleased to hear from Major P. P. Graves that he has now left the hospital in Athens and hopes to recuperate in Crete, Rhodes, Cyprus, and perhaps Smyrna in the early part of the year. He suggests that some of our collectors should try Greece ere long. He says,

"It would be interesting to give *Taygetus* a further visit and add detail to Holtz's mere catalogue (which contains *Turania panagaea* v. *taygetica*, Reb., 'a form of *L. eros*,' which I take to be the greenish *eros* like mountain *candalus* of Lebanon). Thessaly is *terra incognita*—so is Olympia and its region. We know little indeed of Mt. Olympus, save that *Polyommatus (Agriades) thetis* occurs there and nothing of the Pindus. But if anyone wishes to visit Greece I would recommend them to give Pindus and Olympus a miss for the present. There are still some armed deserters knocking about there. The rest of the country is safe enough.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

November 11th, 1920.—NEW MEMBER.—Mr. A. F. Hemming, F.Z.S., F.E.S., Treasury Chambers, S.W. 1. was elected a member.

INDO-MALAY LEPIDOPTERA.—Mr. Grosvenor exhibited numerous species of *Limenitis*, *Athyna* and *Neptis* from Thibet and the Indo-Malay region.

VARIATION IN *P. FLAVICORNIS*.—Mr. Newman, gradations from the dark Rannoch form to the very light southern form of *Polyphoca flavicornis*.

M. TILIAE ABERRATION.—Mr. Bunnett, a *Mimas tiliae* with the usual transverse bar reduced to a small triangular discal spot.

R. PHLEAS ABERRATION.—Mr. B. S. Williams, a *subradiata* form and a *caeruleopunctata* form of *Rumicia phlaeas* from Finchley.

RACES AND BROODS OF *H. SYRINGARIA*.—Mr. A. A. W. Buckstone, several series of *Hygrochoia syringaria* bred and inbred from larvæ taken at Wimbledon in 1913, 1915, and 1919, with captured specimens, and read notes on the pairings and broods obtained; he also showed living pupæ and imagines of *Pyrameis atalanta*, and full-fed larvæ of *Abraxas grossulariata*.

PAPER.—Dr. Dixey, F.R.S., read a paper on "Sexual Dimorphism" illustrating his remarks with a large number of coloured diagrams and a series of lantern slides.

November 25th.—ANNUAL EXHIBITION.—NEW MEMBERS.—Mr. G. D. Morison, 100, Fielding Road, W. 4: Mr. D. Watson, 12, Park Place, Gravesend; Mr. G. W. Young, F.G.S., 20, Grange Road, Barnes; Mr. W. West, 29, Cranfield Road, Brockley; Mr. F. H. and Mr. H. M. Simms, The Farlands, Stourbridge, were elected members.

EXHIBITS.—A short series of *Leptomeris (Acidalia) immorata* and of *Ino (Rhyagades) globulariae* from Sussex were presented to the Society's collection by Mr. F. G. S. Bramwell of Brighton, and were exhibited.

Lord Rothschild exhibited the series of 1277 specimens of *Abraxas grossulariata*, L., from the British collection of the Tring Museum. They consisted of the series from the Bright and Gibbs collections and those collected by himself. The larger number of the more extreme varieties were bred by the Rev. Gilbert Raynor.

Mr. C. H. Williams exhibited a drawer of varieties of the same species.

Mr. Hy. J. Turner, a large number of extra-European forms of

well-known species and species closely allied to those in the European area.

Mr. Leeds, long series of aberrations of British Butterflies taken in 1920, with their varietal names as far as possible from the late J. W. Tutt's *British Lepidoptera*.

Mr. W. G. Sheldon, his series of about 1400 specimens of *Peronea cristana*, including examples of all the 72 named forms and the type forms of 39 of them. He also shewed about 250 examples of *Leptogramma literana* and its numerous forms.

Mr. Percy M. Bright, a long series of *Epinephele tithonus* aberrations, including a white suffused form and a gynandromorph; *Argynnis aglaia* forms, including several magnificent melanic examples, and a scaleless aberration with perfect fringes.

Mr. B. W. Adkin, a series of aberrations of *Satyrus semele*, among them a male from Kent with four eyespots on the forewing.

Mr. T. H. Grosvenor, series of British species which occur in India, including *Papilio machaon*, *Pieris brassicae*, *Gonepteryx rhamni*, *Colias hyale*, *Apatura iris*, *Pyrameis cardui*, *Polyommatus icarus*, *Aricia medon*, *Rumicia phlaeas*, etc.

Mr. Pickett, series of aberrations of *Agriades coridon* taken in 1918, 1919, and 1920.

Mr. L. W. Newman, aberrations shewn in the different British races of *Melitaea aurinia*; a hybrid of *Selenia bilunaria* and *S. tetralunaria*; *Colias edusa* with one wing bleached; a yellow, Cheltenham form of *Gonodontis bidentata*; melanic examples of *Zygaena trifolii*; extreme forms of ab. *varleyata* of *Abraxas grossulariata*, etc., etc.

Mr. Riches, *Cossus ligniperda*, including a specimen with almost black hindwings.

On behalf of Mr. L. A. E. Sabine, Mr. Newman, a long series of the beautiful Irish race of *Polyommatus icarus*, series of the Irish forms of *Epinephele jurtina*, *Rumicia phlaeas* including ab. *alba*, *E. tithonus*, *L. sinapis*, etc.

Mr. A. A. W. Buckstone, aberrations of *Hipparchia semele*, of many local races.

Rev. Geo. Wheeler, a series of *Melitaea phoebe* from Central Europe showing a wide range of variation over a limited area.

Mr. C. W. Sperring, aberrations of British Lepidoptera including *Colias edusa* var. *helice* minus blotches in border on hindwing, *Brenthis euphrosyne* with striated hindwing, a dull leaden *Agriades coridon*, etc.

Mr. Edelsten, a yellow form of *Cybosia mesomella* and a black and grey *Nisoniades tages* from Chippenham Fen.

Mr. B. S. Williams, a series of the new Finchley form of *Dysstroma (Cidaria) truncata* and crosses between it and the usual black form.

Mr. A. W. Mera, species and hybrids of the genus *Oporabia*, *O. filigrammaria*, *O. autumnaria*, *O. dilutata* and its pale race *christyi*.

Dr. Leonard Hopper, the rare *Leucania extranea (unipuncta)* from Penryn, Cornwall, September, 1920.

Mr. A. E. Tonge, Royston forms of *Agriades coridon* and aberrations of many British species including a melanic male of *Boarmia consortaria*, a confluent *Zygaena trifolii*, a male *Agriades thetis* with extra orange lunules on the hindwings, etc.

Mr. L. E. Dunster, bleached *Epinephele jurtina*, *Argynnis aglaia*

with white marginal spots, *Aphantopus hyperantus* ab. *arete*, an *Aricia medon* without orange markings, etc.

Mr. Johnston, aberrations of *Dryas paphia* and *Limenitis sibilla* from the N. Forest.

Captain Riley, the Scilly Islands race of *Epinephele jurtina* much resembling the southern race *hispulla*.

Mr. H. E. Garrett, aberrations of British Lepidoptera, including *Rumicia phlaeas* with confluent spots on forewing, *Euchloe cardamines* with dark hind-margins to forewings, etc.

Mr. H. J. Turner, two coloured plates, folio, with figures of the larvæ of *Eupithecia assimidata* and *E. abbreviata*.

Prof. Poulton, F.R.S., a series of Butterflies captured migrating from one valley to another and back again next morning, with their mimics, in Selangor. They were captured in March, 1920, and were *Delias* species, the mimics being *Euschemia* species.

On behalf of Mr. J. J. Joicey, Mr. G. Talbot, a large number of new and little known Lepidoptera from Central Ceram, Dutch New Guinea, French Guiana, Hainan Island, Peru and Brazil, with many striking and brilliant species, and a long series of aberrations of British Lepidoptera, including *Pieris napi*, *Colias edusa* ♀, with left forewing ab. *helice*, with asymmetrical, unicolorous, streaked and melanic aberrations of various species.

Messrs. O. R. and H. de B. Goodman, a set of series of British Butterflies showing gradation of coloration and markings, and an American Hesperiid, *H. syrichtus* from Surrey, also varied series of butterflies taken in July, 1920, in the Rhone Valley and around Courmayeur, Italy.

Mr. S. Edwards, mimetic species of *Papilio* and species of *Parthenos*.

Mr. Douglas H. Pearson, a large number of species and forms taken by him in the Pyrenees, including very dark ♀ *Melitaea didyma*, the ab. *cleodoxa* form of *Argynnis cydippe*, *Parnassius apollo*, *Coenonympha oedipus*, upper wing unspotted, *Lampides boeticus*, *Erebia lefebvrei*, *E. manto* race *cecilia*, *Heteropterus morpheus*, etc.

Mr. Robt. Adkin, the black ab. *chrysanthemi* form of *Zygaena filipendulae* bred from a Lancashire larva, and *Melitaea cinaria* with intensified markings.

Mr. L. Tatchell, a photograph of a gynandromorph *Amorpha populi* from a Wanstead larva, larvæ of *Dysstroma truncata*, and reported the pairing of a ♂ *Sphinx ligustri* with a ♀ *Smerinthus ocellatus*.

Mr. K. G. Blair, on behalf of Dr. Gahan, a larva of a *Nemopteron* sp. from Syria, always found in dens on sand.

Mr. Jackson, a mixed gynandromorph of *Cosmotriche pendularia* bred from Oxford.

Mr. F. W. Edwards, a pair of the rare British gnat *Orthopodomyia pulchripalpis* reared from larvæ from Epping Forest.

Mr. Bowman, series of the forms of *Cosymbia pendularia* recently reared by him, especially ab. *nigro-subroseata* in varied series of seven subordinate forms.

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Duplicates.—Aglaia, Adippe, *Io, T. quercus, Coridon vars., *Fuliginosa (Reading), *B. quercus ♀, Tiliæ, Menthastris, *Linariata, Aurantiaria, Leucophæaria vars. Paniscus. *Desiderata.*—Pupæ of Dictæoides; Imagines of typhon, palpina, camelinia (dark), Curtula, Pyra, and numerous others; Ova of Hispidaria.—Harold B. Williams, 112a, Bensham Manor Road, Thornton Heath, Surrey.

I shall be pleased to exchange Butterflies from the S.E. area of France for British Coleoptera.—Prof. Morel, 1 Rue Bosio, Paris 16, France.

CHANGE OF ADDRESS.—S. G. C. Russell, "Roedean," The Avenue, Andover Junction, Hants.

Mr. Donisthorpe will still be glad to receive ants and Myrmecophiles from all parts of the British Isles, and to name any such for anyone who is kind enough to send them to him. He would however suggest that ants from any other parts of the world be sent to his colleague, Mr. W. C. Crawley, 29, Holland Park Road, W. 14. Mr. Crawley is specialising on the ants of the world, and it is a matter for congratulation that we should possess an Entomologist in this country whose whole attention should be concentrated on this branch of Entomology.

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. 1921, March 2nd.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street, E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. (No Meetings in July or August.) Visitors welcomed. Hon. Sec., W. E. GLEGG, 44, Belfast Road, N. 16.

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Collecting in Asia Minor in 1920.

By MAJOR P. P. GRAVES, F.E.S.

I.—Near Smyrna.

Till recently collecting near Smyrna had been undertaken by a very few German or Austro-Hungarian lepidopterists and by these prior to 1880, after which year brigandage reached dangerous proportions and remained dangerous until the Greek occupation. Dr. Loew, the famous dipterist and the discoverer of *Plebeius loewii*, visited the neighbourhood in the early forties of the last century, but the first lepidopterists, who made any long stay there, were Janes von Frivaldszky, Terren and Zach, who visited the city in 1845. They seem to have found the region unproductive—such at least is Dr. Staudinger's account in his study of the Lepidoptera of Asia Minor, but I suspect that they found it too disturbed to go far inland. Anyhow Terren was finally left to rear *Lasiocampa* (*Pachypasa*) *otus* larvæ to the chrysalid stage and his comrades departed to Brusa. In 1865 Lederer spent a great part of the season at Magnesia (Manissa) and in the Smyrna region. During the previous year he had done some collecting at Gineo, near Eudemish at Kizilji Auly or Aoli, the "Reddish sheepfold," an estate managed by the old collector Nogell in the Boz Dagħ Range and in the Ovajik Range, and had stayed for seven weeks in the centre of the Boz Dagħ Range itself, proof positive that the country was then in better order than it was in more modern times, when the Boz Dagħ was a great centre of brigandage. Unhappily Lederer does not seem to have published anything as to the results of his collecting in 1865. Most of our limited information as to the insects occurring near Smyrna has been supplied by Dr. Krueper, whom I met at Athens early in 1915. Dr. Krueper collected at or near Smyrna from Feb. 6th to July 17th in 1863, from Feb. 18th to July 28th in 1866, from March 2nd, 1871, to July 13th, 1872 (except for the period May 2nd to June 10th, 1872, when he stayed at Nymphio), and finally from April 2nd to April 17th in 1875. Most of his collecting was done at Burnabad (also known as Burnabat or Burnova), a very pleasant village where many of the European residents of Smyrna dwell, situated at the foot of a mountainous region, some five miles from Smyrna. He found the old Turkish cemetery the best collecting ground. When I visited the village Greek 6 inch howitzers filled the cemetery. Near Buja, where there is some pretty country, there were large camps, and I, therefore, did little collecting there, not that the Greek soldier is nowadays indisciplined or disagreeable, but because camps always mean sentries, persons who ask you for passes, or cheerful inquisitives who want to know whether you mean to eat 'em when you catch them, or what, or worse still, the would-be-usefuls who pursue the most battered and commonest specimens with excess of zeal, and bring them to you minus heads and a wing or so. My collecting was therefore practically confined to two points—the hills beyond Cordelio, a suburb on the N. side of the Gulf of Smyrna, and the hilly pass between Burnabat and Manissa, some 6 miles at my furthest point from Burnabat on the reverse (Manissa) slope of the mountain country. The weather was excellent. The country under the stern but just rule of the Greek Harmost, Mr. Sterghiades, was as safe as England. I indeed just missed seeing the

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public execution of the leaders of the last batch of brigands who, though Greeks, were yet hanged as high as Haman by the orders of the hard handed Cretan who rules Smyrna to-day for Greece. They had murdered some 15 people, Greeks and Turks, in their long career, and no one sympathised with them.

The general impression I had from two afternoons' collecting and an hour's pottering about with a net near Buja, was that the country, where not too well cultivated, was fairly prolific in butterflies, but that, as in Attica, which it to some extent resembled in its flora, though it was less dried up, the number of species on the lower ground was more limited than is the case in moister and later Constantinople. The season seemed to be nearly a month earlier than on the Bosphorus. Thus *Aporia crataegi*, which near the Bosphorus does not emerge till late in May, was well out on April 21st near Cordelio. Males of *Leptosia duponcheli* were very worn for the most part on the Burnabat-Manissa road on April 23rd. I found them fresh at Dil Iskelessi, one of the hottest localities in the Constantinople region, on May 2nd, 1914. The "whites" were all but over and *Rumicia phlaeas* likewise. *Thais cerisyi* gave me a disappointment. I expected to find it fresh and frequent. The only specimen I caught was worn. I saw a very few others, mostly worn from the look of them, in places where I could not catch them.

At Cordelio, or rather about 500 feet above it on a stony plateau, I found *Hallia marlyi* frequent on April 21st. It is very hard to catch and easily injured in the catching. Its habits were of interest. It generally selected the tops of boulders to rest upon and was not easily seen there. Pairs of this insect, male and female I imagine, though I could not actually prove this by capturing both at a time, flew about at a height of from 2 to 3 feet above the ground with a curious buzzing flight such as is noticed with other "skippers," one individual, perhaps the male, keeping about 6 inches immediately behind his companion. Then suddenly, for no apparent reason at times, at other times when disturbed, the leading insect of the pair would shoot up about ten feet in the air and turn in its flight so rapidly that one was left with the impression that it had "looped the loop," and the second insect would follow its course and imitate its action. both, after "towering" in this fashion, making off at great speed.

The pass on the well-kept carriage road between Burnabat and Manissa struck me as being good collecting ground as did the country about 5 miles further inland also on the line of this road. But on the occasion of my visit there was a good deal of cloud and my time was limited. *Hesperia malvae*, a fresh female, was an interesting capture here. I had no time to go high into the mountains near Smyrna, Tahtali Dagh, Nif Dagh, etc. These might have proved productive even so early in the year.

The following species were either captured or certainly recognised between April 19th and April 23rd.

Hallia marlyi.—Frequent above Cordelio on April 21st. Three seen, two taken, between Burnabat and Manissa, April 23rd.

Erymnis alceae.—A few worn specimens noted.

E. orientalis.—Two fresh males, not differing from the Constantinople form, at Cordelio and on the Manissa Burnabat road respectively, April 21st and April 23rd.

H. ? malvae.—A fine female apparently of this species on the Manissa-Burnabat Road on April 23rd.

Powellia orbifer.—Beginning to appear above Cordelio and on the Manissa-Burnabat Road, April 21st and 23rd. Males only seen.

Rumicia phlaeas.—Usually worn and not common at all stations. The only specimen taken in good order was distinctly on the way to *aestivus*, having the black margin of the forewings and the black spots on these wings larger than in normal near eastern vernal specimens.

Callophrys rubi.—Two in fair order at about 900 feet on the pass behind Burnabat on April 23rd.

Celastrina argiolus.—Seen in the Consulate and Garden at Smyrna on April 20th.

Scolitantides (Turania) baton.—One fresh male taken with *C. rubi* on April 23rd.

Aricia medon.—Abundant and generally fresh near Cordelio on April 21st. Frequent at other stations. The form resembles that taken at Athens.

Polyommatus icarus.—Generally frequent. Females not yet fully out. The form taken here is distinctly nearer *zelleri*, Vrtz., than that found at Constantinople and resembles the Athens form. Such females as were taken were but slightly, when at all, suffused with blue scales,

Ipheclides podalirius.—Seen here and there but not taken.

Thais cerisyi.—Not at all common, and worn.

Aporia crataegi.—Abundant above Cordelio and seen near Burnabat on April 22nd.

Pieris brassicae.—Going over. Seen in small numbers at all stations. I was doubtless too late for the main flight of the first brood.

P. rapae.—The same remarks apply to this species as to *P. brassicae*.

P. daphidice.—A few specimens of the vernal form of *daphidice* were taken.

Anthocharis crameri (belia) var. graeca.—Two specimens taken at Buja, April 20th. Others seen.

Euchloë cardamines.—A male on the pass above Burnabat, April 23rd.

Colias edusa.—Seen in small numbers.

Gonepteryx cleopatra.—A male seen near Burnabat on April 22nd. Unluckily I could not catch it so cannot say whether it belonged to the Greek form or to var. *taurica* of S. Asia Minor, Syria and Cyprus.

Leptosia sinapis.—Sparingly on the Burnabat-Manissa Road on April 23rd.

L. duponcheli.—Local on the same road on April 23rd but much more frequent than *L. sinapis*. One female taken. I notice a marked, probably racial, difference between the seven specimens I brought back and those I have of the vernal brood from Diliskelessi, between Ismid and Constantinople (14 specimens) on the one hand and a male Syrian specimen from Baalbék on the other.

Pyrameis atalanta.—Seen April 20th, in Smyrna town.

P. cardui.—Only a few battered specimens noticed.

Melitaea phoebe, var. ?—A fine specimen taken on the roadside on April 23rd and another seen. The specimen taken differs somewhat from the Athens form and very much from that which I have from Bithynia.

Melitaea trivia.—Larvæ of this species seen on *Verbascum thapsus* on April 23rd.

Pararge megera.—Not uncommon at Buja, April 20th. Seen at Cordelio and Burnabat.

P. maera.—One fresh male seen and missed above Cordelio on April 20th.

P. aegeria.—A very much damaged female taken on April 23rd.

C. pamphilus, race *marginata*.—Sparingly at all stations. The specimens I brought back much resembled those I have from Constantinople except that they are perhaps a trifle lighter on the underside of the hindwings than the latter.

Total 31 species.

II.—Panderma.

During a visit, which I paid to Panderma as the guest of the Greek fleet at the beginning of July, when the town was captured by the Hellenic forces without opposition, I was able to get two afternoons off, viz., on July 4th and July 6th at Tut Liman (Mulberry Port) about a mile to the E. of Panderma. Tut Liman is a creek behind which is a valley full of olive, mulberry and fig orchards, watered by a small perennial brook, and bordered by steep rocky slopes. Though facing north it is extremely hot and proved a good hunting ground.

Three Lycenids (*sensu lato*) were very abundant among the trees early in the afternoons, swarms rising from the ground as one walked through the shady patches. These were *Agriades thersites*, *Aricia medon*, and *Rumicia phlaeas*. *A. thersites* was out in far greater numbers than *Polyommatus icarus*, of which I saw a few specimens. It has certainly appeared to me that this species, in its second brood at all events, comes out earlier than *P. icarus* and that the "brood" is more concentrated, so to speak, large numbers appearing in favourable localities while *P. icarus* has a slow, more graduated emergence. Among the specimens of *A. thersites* is a ♀, which while identical with local and Constantinople specimens of *A. thersites* as far as the colour of the upperside, and the arrangement of the underside spotting was concerned, had a tiny single basal spot on the underside of the anteriors. I am not sure whether this is a case of accidental resemblance to *A. thersites* by an aberrant *P. icarus* female or an aberration of *A. thersites*. I may note that in the Sea of Marmora region I have never yet found any approach to *A. thersites* among females of *P. icarus* as far as the arrangement of the spots near the tornus of the underside anterior wings and near the costal margin of the underside hindwings is concerned. *A. medon* and *R. phlaeas* were large and the former was very decidedly of the *calida* form. *R. phlaeas* was of different forms, *eleus* being the lightest and not the most frequent. Other insects noted included *Satyrus syriaca*, which was quite frequent among the olive trees, and *Hipparchia briseis* var. *major*, a fine large race, of which I did not bring back nearly as many as I should have done. It was very wary and the place where it was commonest—namely, the sea cliffs near the port railway station, W. of the town—proved very difficult and treacherous ground when I tried to work it for about 40 minutes in the late afternoon of July 7th. *S. circe* was worn. *Hyponphele lupinus*, of a form which seemed to me to approach *intermedia*, occurred very sparingly in the shadiest portions of the orchards.

My captures here were the following :—

Erynnis alcea.—A few second brood specimens seen. Those taken were normal enough.

Powellia orbifer.—One worn out female of the first brood.

Thymelicus actaeon.—One passable female. Many more seen, all utterly worn out.

Adopaea flava.—In even worse condition than the preceding.

Rumicia phlaeas.—Large dark forms abundant.

Chrysophanus thersamon.—Not uncommon and fresh; males slightly lighter than the Constantinople average.

Loweia dorilis.—One male captured, others seen.

Celastrina argiolus.—A few, worn as a rule, in the orchards.

Aricia medon g.a. *calida*.—Abundant and generally fresh.

Polyommatus icarus.—Not frequent. Very normal specimens of the Mediterranean form.

P. admetus.—One very fresh male on July 6th at Tut Liman.

Agriades thersites.—The most abundant "blue" by far. Males well out.

Iphiclides podalirius.—Not uncommon in the orchards.

Pieris brassicae.—Rare.

P. rapae.—Fairly frequent in the orchards. Of three ♀ brought back two are very heavily marked with black and one has the right antenna about $\frac{1}{4}$ the length of the left antenna.

P. napi.—Males only were taken. These had extremely little dark shading along the veins of the underside hindwing.

Pontia daplidice.—Not common.

Colias edusa.—A few.

Leptosia sinapis.—Rare. The two specimens which I brought back are quite normal southern second-brood specimens.

Dryas pandora.—A few on thistles.

Pyrameis cardui.—Frequent.

P. atalanta.—One damaged specimen released.

Limenitis camilla.—In bad order and not frequent.

Pararge megera.—Second brood specimens ♂s only, beginning to emerge.

P. maera.—One second brood ♂ specimen unfortunately damaged.

P. aegeria.—In shady places. The form was simply *intermedia*, brighter in ground colour and with yellower spotting than *egerides*, but nowhere near the brightness of ground colour and rich yellow spotting of specimens from Athens and Syria.

P. roxelana.—From the number of damaged females flying about in shady places this species must have been frequent a month earlier.

Satyrus circe.—Going over.

S. syriaca.—Frequent and often in good condition. Of large size and deep colour.

Hipparchia briseis.—Frequent. All taken are of the race *major*. In good order as a rule.

Hyponephele lupinus v. *intermedia*.—Local and sparingly.

Epinephele jurtina.—Females only.

Coenonympha pamphilus.—All taken were g.a. *marginata* of the race *lyllus*.

M. galathea race *turcica*.—Very worn. Had been frequent.

M. larissa.—Very worn. Had evidently been common, ♀s only taken.

Total, 35 species. The absence of *H. semele* may surprise the reader as it surprised me.

III.—Brusa.

From September 19th to September 21st inclusive I was at Brusa. I collected daily but did not venture up the mountain, since this huge area of rock, forest and gulley is altogether too large to be patrolled by the Greek forces now holding Brusa, and it would have been unfair to ask the Hellenes for gendarmes for special protection of a casual visitor. On the 19th I went down early to the marsh known as Softa-Bughan (the Softa Swallow, so-called because a Softa or theological student once perished there) to look for *Chrysophanus dispar* v. *rutilus*. The marsh was too dried up to be in the least dangerous, and there were fewer patches of dried mud and reeds in it than there were banks and islands of firm and solid ground. Flowers were still fairly numerous, thistles, various kinds of spearmint, a sort of agrimony, etc., but butterflies were rather uncommon. The commonest although the hardest to catch was *Everes argiades* of the third brood, a very small form indeed. It differed greatly from the *Everes* which I have taken at Kury Yalova, and which I suppose to be *E. alcetas*. The small Brusa insect has a good show of orange spotting near the anal angle underside hindwing. The sub-marginal spots on the underside of the anteriors are of linear shape, less round than those of the Yalova species, and their alignment is slightly different in some specimens. The tails of the hindwings are more developed in the supposed *argiades*. On the other hand the supposed *alcetas* from Yalova has very faint traces of pale yellow scaling about the ocellated spot on the underside of the hindwings near the anal angle, though I do not believe that such traces of yellowish scaling, if present in an *Everes*, must necessarily prove that it is not *alcetas*. I took a short series, mostly consisting of males here, and afterwards found the insect elsewhere near Brusa always in moist localities. It was hard to catch and easily damaged in setting. Of *C. rutilus* I only took 2 worn and rather chipped females that day.

Next day I went out on a picnic to Kestel some 9 miles E. of Brusa. I had little time for collecting there, but saw two male *C. rutilus* in an overgrown irrigation ditch and caught both. They were slightly chipped but in good condition otherwise, and one was of fair size. Very lovely they looked in flight. *Lampides boeticus* occurred here in fields where a sort of runner bean was cultivated, I think the Leblebé, a plant akin to *Dolichos lablab* of Syria. I fear I neglected *L. boeticus*. I have seen so much of it in Egypt and parts of Syria, and save in size it is so distressingly invariable. Anyhow I only brought back one pill-boxed specimen and it proved to be damaged. Other things taken here were *Leptosia sinapis* of the third brood (rare), *P. aegeria* and *Polyommatus icarus*. On the previous day I had worked a steep slope above Chekirgeh to the W. of Brusa town, and found *P. icarus* abundant and with it plenty of *Aricia medon* in bad order, *P. anteros*, fresh males, and a few *L. dorilis*. All of the last species I could take I took, and all were fresh but with great splits and chips in their wings. The form did not differ from that of Constantinople.

On the 21st I spent a long morning among the orchards to the N. of Brusa. Here I took four fresh *C. rutilus* among the ditches, three fine males and a chipped female, and also a fresh male of *C. thersamon*. There was a good deal of dock in the ditches which did not seem to me to be big enough to be the Great Water Dock. In most places where this dock grew one might see a male *rutilus* darting about, but it was a lively insect and seeing it was one thing and catching it another, especially where brambles overhung the ditches. One male has a well marked spot between the discoidal spot and the base on the upperside of the anteriors. Has this form been named? I devoted some attention to third brood *Pieris rapae* and *P. napi*. The former resembled the Constantinople autumn race of *P. rapae* which has a facies of its own as compared with the first and second broods. *P. napi* showed in one or two cases more black scaling along the venation of the hindwings on the underside than is usual on the Bosphorus. I neglected *P. brassicae* rather to my regret, as I might have taken several specimens and had meant to try to find out whether the Brusa insect of the third brood was *P. brassicae* proper as are Constantinople autumn specimens for the most part, or approached g.a. *catoleuca*, Röber, which is the usual East Mediterranean summer form in my limited experience.

The following species were taken or recognised at Brusa.

Erynnis alceae.—Frequent everywhere.

E. orientalis.—One female.

Hesperia (Hallia) malvae.—One very worn male at Kestel.

Hesperia armoricanus.—One worn male below the town.

Powellia orbifer.—A few worn-out females of the small second brood.

Chrysophanus thersamon.—One male only.

C. dispar var. *rutilus*.—In the orchards, etc., below the town, and at Kestel. See remarks above.

Loweia dorilis.—A few males on the slopes above Chekirgeh.

Rumicia phlaeas.—A few.

Lampides boeticus.—Common at Kestel and a few seen at Softa Boghan.

Syntarucus telicanus.—Frequent everywhere.

Everes argiades.—Fairly frequent in the meadow near Softa Boghan marsh. Less frequent elsewhere.

Aricia medon.—Frequent above the town but worn. Those taken were normal enough specimens of g.a. *calida*.

Polyommatus anteros.—Males only taken above Chekirgeh.

P. icarus.—Frequent everywhere.

Celastrina argiolus.—A few males, one very fresh, in hedges and orchards.

Papilio machaon.—A few seen; those taken were badly worn.

Pieris brassicae.—Not uncommon.

P. rapae.—Frequent.

P. napi.—Specimens both of a more or less typical form and of a *napaeae*-like form were taken.

Pontia daplidice.—Frequent.

Colias edusa.—Also frequent.

Gonepteryx rhamni.—A fine male seen at Kestel.

Leptosia sinapis.—Rare.

Dryas pandora.—A few worn specimens still out.

Polygonia egea.—One seen near the town.

P. e-album.—One fine 2nd brood specimen with very dark underside, as is the rule for this brood at Constantinople.

Pyrameis cardui.—Frequent.

P. atalanta.—One seen.

Pararge megera.—A few in moderate condition.

P. aegeria.—Frequent and usually in good order in shady places.

Epinephele jurtina.—Very worn females still frequent.

Coenonympha pamphilus, race *lyllus-marginata*.—Apparently going over. The only fresh specimens were females.

Total 33 species, a fair number for so late a date.

May I add a few geological notes. The ground on which I collected at Cordelio, near Smyrna, was alluvial on the lower levels, but limestone, Miocene or Pliocene, on the high slopes. At Buja the rock is Eocene or Oligocene. Between Burnabat and Manissa one passes through a belt of chalk country.

Panderma lies at the junction of three geological formations—Eocene limestone at Tut Liman, Pliocene or Miocene limestone to the S.W. of the town, and along the cliffs W. of the town a belt of what seems to be a Primary formation, possibly Devonian.

The coast at Mudania and the country inland as far as the marshes below Brusa is limestone, apparently Tertiary. The marshland is alluvial. The lower slopes of the mountains give the impression of limestone soil lying on metamorphic rock. The higher parts of the mountains are, largely at all events, granitic.

Notes from West Sussex: Lepidoptera in 1920

By J. F. BIRD.

Having spent from the end of March to August 24th in Sussex, I send a few notes on my entomological experiences in that county hoping that they may be found of interest. Owing to various circumstances I regret that I was unable to do any dusking, or other night-work, therefore my observations refer, chiefly, to the local butterflies, and I may as well mention that most of my collecting was done in the district bounded by the rivers Adur and Arun. I found many of the butterflies abundant, and a feature of the season was the sudden appearance of numerous *Pyrameis cardui* and a good number of *P. atalanta* in May. During my five months' visit I met with 38 species of Rhopalocera, which I here place in the order of their appearance, with dates, and with a few notes added with reference to localities, variation, etc. During April I neglected to record the actual dates of the first appearance of the Lepidoptera observed, so I can only state that the five butterflies heading the list were all on the wing by the middle of that month.

Pieris brassicae.—Fairly common throughout the district. The second brood made its appearance on July 16th.

P. rapae.—Common. The second brood first recorded on July 13th.

Euchloë cardamines.—Plentiful in all the rural parts.

Celastrina argiolus.—Not common, and only seen in the neighbourhood of Worthing. The second brood was not observed.

Aglaia urticae.—Not common. Fresh brood on July 24th. Worth-
ing, Sompting, Lancing, and Bramber.

Gonepteryx rhamni.—Hybernated specimens first recorded on May 10th; not uncommon in the vicinity of woods and heaths. I was surprised not to see any of the fresh brood later in the season.

Vanessa io.—May 14th. Scarce, only a few hybernated specimens observed near Steyning and Goring. I saw nothing of the fresh brood.

Pyrameis cardui.—May 14th. Immigrant specimens were extremely plentiful in the spring and early summer, especially in that part of the country embracing the Downs. The fresh brood, though not quite so much in evidence, was also common, and put in an appearance on July 19th.

P. atalanta.—May 14th. Hybernated, or immigrant, specimens fairly numerous, and met with in company with *P. cardui*, sunning themselves on the roads, more frequently in the lanes leading up to the Downs. The fresh brood, first noticed on July 19th, was also rather common.

Pararge megera.—First brood, May 14th; second brood, August 3rd. Common, more particularly in Down-land and on the sandy heaths north of the Downs.

Hesperia malvae.—May 14th. An abundant species in many localities.

Pieris napi.—First brood, May 20th; second brood, July 12th. Common.

Callophrys rubi.—May 20th. Sparingly met with near Clapham, Angmering, Washington, and Edburton.

Brenthis euphrosyne.—May 20th. Locally common in several of the woods both north and south of the Downs. On May 26th, in a wood near Patching, I netted a fine ♂ aberration while it was settled and sunning itself on the ground. The forewings of this specimen are edged along the outer and inner margins with a blackish suffusion, the four basal markings coalesce and make a large, solid, black patch, while the zigzag series of spots, beyond the black marking at the end of the discal cell, are confluent, forming an irregular and broadish band across the middle of the wing; the basal markings on the hindwings are, also, strongly marked and confluent, but clearly defined without any suffusion of black scales.

Rumicia phlaeas.—First brood, May 21st; second brood, July 16th. Not uncommon. I took two interesting specimens: (i.) A ♀, on June 1st, near Clapham, which may be described as *ab. radiata-caeruleopunctata*, as it combines both these named forms; and (ii.) a ♀, on August 17th, near Storrington, which has the outer part of the copper-colouring on the right forewing bleached, while the submarginal spots on both forewings are rather elongate. *Ab. caeruleopunctata* was not uncommon in the district.

Aricia medon.—First brood, May 21st; second brood, July 24th. Clapham, Lancing, and Edburton. Not so common as one might have expected considering the abundance of its food plant, *Helianthemum chamaecistus*.

Coenonympha pamphilus.—May 21st. Common throughout the district.

Nisoniades tages.—May 21st. Plentiful in many localities on, or

near, the Downs; also by the sea near Goring, and frequenting a common near Fittleworth.

Polyommatus icarus.—First brood, May 24th; second brood, July 14th. Abundant throughout the district, especially on the Downs. *ab. arcua* was not uncommon, and I also took a very fine example of *ab. melanotora*, on the Downs near Steyning, on June 5th. Another rather interesting specimen was a ♂, taken on August 7th, near Sompington, which has only five submarginal spots on the forewings, the last being absent.

Pararge aegeria.—May 24th. Very scarce in woods near Madehurst and Angmering.

Colias edusa.—The first one I saw was on June 1st, at Clapham, flying rapidly, and, apparently, on a "non-stop run" to the north! I saw no others until the fresh brood put in an appearance on July 31st, when I saw two flying along the side of the road near Lancing, whilst I was cycling, and although I visited several clover and lucerne fields, hoping to obtain some "Cloudeds," I only saw two others in Sussex, one, a fine ♀, which I netted in a chalk pit near Lancing, on August 3rd, and the other near Portslade, seen from the train on August 24th, when we were leaving the county.

While mentioning this species it may be of interest to note that we came across it again in Devonshire, near Teignmouth, where we saw at least half-a-dozen, and my eldest son netted a ♂ at Stoke-in-Teignhead on September 3rd.

Agriades thetis.—First brood, June 2nd; second brood not observed. Local, but in a few places abundant, on the Downs. The first brood was on the wing well into July, and during that time I must have netted and examined a goodly number, but most were allowed to depart in peace as only a certain amount of variation was noticed, such as *ab. puncta*, not uncommon amongst the ♂s, and the more or less conspicuousness of the orange-coloured crescents on the outer margins of the wings in the ♀. In fact, no very remarkable aberrations were taken. However, I will briefly describe a few forms obtained which may be of some interest:—(i.) Four ♀s, more or less powdered with blue scales, principally on the basal portion of the wings, and in one specimen the blue scales on the forewing spread below, and beyond the discal cell. (ii.) A ♀, taken near Steyning on June 9th, on the under-side of which the 2nd and 3rd spots of the outer series are connected with the discoidal spot by white streaks running along the veins containing small black dots. (iii.) A ♀ which is a more developed form of the last, and taken at the same time; the 2nd, 3rd, and 4th spots of the outer series are cuneate, the points of the wedges approaching closely the discoidal spot. (iv.) A ♀, same locality and date, with no spots between the discoidal spot and the base of the forewing, a parallel aberration to *P. icarus ab. icarinus*.

Cupido minimus.—First brood, June 8th; second brood, August 3rd. Locally common on the Downs between Sullington and Fulking. As a rule to be found in sheltered hollows and chalk pits, but I found one colony on the borders of a field on Kitswell Hill, late one afternoon, where I noticed these little butterflies in their sleeping positions amongst the long grass, the position generally chosen being rather low down on the stems. I came across a few of the second brood in a chalk pit near Lancing, between August 3rd-11th. This species does not appear to vary much except in size.

Agriades sylvanus.—June 9th. Common in many localities, more especially on the Downs.

Epinephele jurtina.—June 11th. Common throughout the district.

Brenthis selene.—June 15th. Very local, but plentiful in two localities only—in a marshy corner of a common near Storrington, and in a heathy hollow on the Downs, near Sompting. I fancy that members of the latter colony were generally smaller than those found at Storrington.

Melanargia galathea.—June 25th. Locally abundant between Steyning and Lancing. A single example, a ♂, was found at rest as early as June 25th, and on going to the same locality three days later I found plenty more ♂s out, but not a single ♀ could I see. On July 2nd, however, both sexes were well out, and it was a pleasing sight to see this handsome butterfly so remarkably abundant. A visit to one of its principal haunts was made on August 11th, when I found a few still on the wing, but getting very worn. With the exception of one yellowish ♂, I noticed no great variation.

Argynnis cydippe.—June 29th. Met with sparingly in the woodlands near Patching, Angmering, and Storrington.

Argynnis aglaia.—June 30th. Not very common, but met with on the Downs near Sompting, Lancing, and Edburton. On June 30th, near Sompting, I netted a male with the spots inclined to be greenish, which gives to the markings a remarkably soft appearance. Sussex specimens appear to be smaller than our West Somerset race.

Aphantopus hyperantus.—July 3rd. Locally common, near West Grinstead, Storrington, and Angmering.

Epinephele tithonus.—July 9th. Plentiful in most parts of the district, but, apparently, not very variable.

Agriades coridon.—July 9th. Locally plentiful on the Downs, but disappointing, as I obtained no striking aberrations. It may be worth recording, however, that in a chalk pit near Lancing I met with a few dwarf specimens, and also the following forms were taken:—(i.) A ♂, with broad blackish borders on all the wings containing whitish ringed spots, which, on the hindwings, are clearly defined, but less distinct on the forewings. The clouding of the borders also invades the fringes and increases the black chequering, especially towards the apex of the forewings. (ii.) A ♀, strongly powdered with blue scales within and below the discal cell on the forewings, and between the veins on the hindwings, forming blue streaks from the base of the wing to the edge of the submarginal spots, the latter being ringed with dull orange, also the discoidal spot on the hindwings is ringed with blue.

Limenitis sibilla.—July 12th. It was unfortunate that the weather at the end of June and the beginning of July was unfavourable for collecting. However, on July 12th, 13th, and 14th, when the sun, at intervals, made efforts to assert itself, I tried for this species in a wood near Angmering, where I found it not uncommon, but in ragged condition, and rather hard to capture, as it frequented the bramble blossoms which happened to be in the densest portion of the wood where it was difficult to wield one's net.

Dryas paphia.—July 12th. Plentiful in woods near Angmering. I saw one very dark ♀, perhaps ab. *valezina*, pursued by four or five ♂s, but, unfortunately, when attempting to net her I only succeeded in bagging one of the suitors.

Bithys quercus.—July 14th. I only came across one example, a ♂, which I netted, in a wood near Angmering.

Adopaea flava.—July 12th. Remarkably abundant in a marshy part of a common near Storrington, where it was to be seen flying about in swarms and settling on the rushes (*Juncus*); also found, less commonly, near Angmering, and on the Downs between Lancing, Steyning, and Edburton.

Hipparchia semele.—July 16th. Locally common on the Downs near Edburton, and at Wiggonholt Common, also found sparingly on the Downs near Steyning, Lancing, and Sompting, in a chalk pit near Clapham, and on a heath near Storrington. I was interested in observing this butterfly late in the afternoon on August 13th, at Wiggonholt Common, as they flew around and settled on the sunny side of the trunks of a group of silver birches, perhaps seeking a resting place for the night. Whilst watching them several flew to inspect me, and one even settled on my arm. I noticed a considerable amount of variation in the undersides of this species, and it is rather surprising that my darkest specimen was taken on the chalk Downs, while the lightest was netted on a sandy heath. I also captured on July 31st, near Lancing, a ♂ with a small extra spot on the upperside of the forewings, between the two usual ocelli.

Plebeius aegon.—Locally abundant on sandy heaths near Storrington and Parham. I was rather too late in trying for this butterfly, so found the majority decidedly *passé*, but I managed to pick out a short series in fair condition. Two ♀s, taken at Storrington on July 16th, may be worth describing:—(i.) With four blue spots on the hindwings just above the band of orange marks, similarly situated as in *R. phlaeas* ab. *caeruleopunctata*. (ii.) With the forewings, as well as the hindwings, conspicuously bordered on the outer margins with large, bright, orange marks—a very beautiful form.

I will now conclude with a few notes on some of the Heterocera recorded, noting at the same time the dates of the first appearance of the insects:—

Zygaena filipendulae.—The first specimens on the wing were observed on June 10th, by the sea near Goring, where plenty of the larvæ were found at the same time, some comparatively small. This abundant species was seen in many localities on the Downs and was noticed in the imaginal state up to about the middle of August. A large colony on the slopes of the Downs, near the Devil's Dyke, was remarkable for the smallness of the cocoons, and from some of these I bred some very dwarf specimens during the latter half of June and the beginning of July. Many from this locality seem referable to the form *hippocrepidis*. *Z. trifolii*.—June 2nd. I met with this species very sparingly on the Downs near Steyning and Sompting, just one or two here and there flying about, or settled on the stems of grass, etc. I also came across a small colony in a marshy part of a heath near Storrington, on June 15th, where I noticed a few empty cocoons on the stems of *Juncus communis*. In this locality I obtained a ♀ as late as July 16th. On June 7th, near Sompting, I took, at rest on grass, a very fine and bright-coloured example of ab. *minoides*. *Sphinx ligustri*.—One larva on July 14th, half grown, on High Down Hill, feeding on privet. *Sesia stellatarum*.—June 2nd. Only one seen, going to the flowering weeds growing in an arable field on the Downs

near Steyning. *Hepialus lupulina*.—June 1st, a ♀ netted flying about in the sunshine on the Downs, near Clapham. *Mitochrista miniata*.—August 7th, a ♀, in fine condition, on a paling at Broadwater. *Lithosia sororcula*.—May 26th, a ♀ clinging to a grass stem, in an oak wood near Patching. *Diacrisia sanio*.—June 17th. Several ♂s “walked up” on the Downs near Steyning, Lancing, and Sompting. *Arctia villica*.—May 31st. Odd specimens found at Steyning and Angmering, one, a ♀, was netted flying along a lane in the daytime. *Malacosoma neustria*.—A few nests of larvæ noticed in the hedges near Goring and Sompting. *Macrothylacia rubi*.—June 3rd. One ♂ netted and a number observed flying on the Downs near Steyning, Sompting, and Sullington, and found in the larval stage near Lancing. *Cosmotriche potatoaria*.—On June 17th, near Lancing, I found a cocoon, high up on a grass stem in a meadow, looking very huge and conspicuous in comparison with the smaller cocoons of *Z. filipendulæ*, which were abundant all around. A ♂ emerged on July 7th. *Drepana falcataria*.—May 26th, beaten out of birch near Patching. *D. lacertinaria*.—I found a nearly full-grown larva on birch near Storrington, on June 15th, from which I bred a ♀ on July 11th, a rather interesting specimen as it is plain ochreous brown without any trace of the usual dark frecklings. *Acrionicta leporina*.—A full-fed larva found on August 17th near Storrington on birch. It changed colour and entered a piece of wood for pupation on the following day. *Agrotis ypsilon*.—August 10th, at Worthing. *A. strigula*.—July 16th, a few disturbed from heather near Storrington. *Mamestra persicariæ*.—June 27th, at Worthing. *Leucania impura*.—August 6th, one found in the daytime, resting on wild carrot blossom, while searching for *Spilodes palealis*. *Cucullia chamomillæ*.—Two nearly full-grown larvæ on *Anthemis*, near Sompting. *Plusia gamma*.—During the spring and the early part of the summer a great many were seen, probably immigrants from the continent. The new brood was met with from July 3rd in astonishing numbers, in fact I cannot remember having seen this species more abundant. *Acontia luctuosa*.—On June 17th, a dull day, I netted a fine ♂ which I had disturbed from the herbage in a chalk pit near Lancing. A careful search on this and following days amongst the *Convolvulus arvensis* resulted in no more specimens. *Bryophila perla*.—July 3rd. Apparently not common in the district, a dozen or so only observed in the town at Worthing and Broadwater. *Prothymnia viridaria*.—First brood, June 8th; second brood, July 24th. Found sparingly on the Downs near Burpham, Steyning, Lancing, and Edburton. As usual, specimens of the second emergence were considerably the larger. *Anarta myrtilli*.—August 17th, although a dull day, several were seen flying about the heather near Storrington. *Euclidia mi*.—May 28th. Common on some rough land near the sea at Goring, and also met with in a grassy lane near Angmering, and sparingly on the Downs in a number of localities. *Zanclognatha grisealis*.—June 17th. Lancing, Worthing, and Storrington. *Venilia maculata*.—May 20th. Not uncommon near Clapham. Angmering, Patching, and Bury. *Bapta bimaculata*.—May 24th, near Bury. *Semiothisa notata*.—August 13th. Two ♂s beaten out of bracken growing under trees on Wiggonholt Common. *S. liturata*.—July 16th. Scarce amongst pines near Storrington. *Lozogramma petraria*.—May 24th. Patching and Madehurst. *Strenia clathrata*.—June 14th to

August 16th. Occurred sparingly near Sompting, Angmering, Lancing, Clapham, and Goring. *Bupalus piniaria*.—June 6th. Storrington. *Aspilates ochrearia*.—May 28th. Not common; at Goring, by the sea and on the Downs, near Clapham. *Tephrosia punctularia*.—May 15th. On tree trunks at Storrington, Patching, and Angmering. *Boarmia consortaria*.—On May 26th I found a ♂ on an oak trunk in a wood near Patching. Is not this a very early date for this species? *Hemerophila abruptaria*.—May 14th. One specimen only seen on a paling at Worthing. *Pachynemima hippocastanaria*.—July 16th. A ♂ disturbed from heather near Storrington. *Abraxas grossulariata*.—June 6th. Very common, and I think inclined to be strongly marked; at Worthing about the *Euonymus*. One of my sons brought me a specimen of *ab. nigrosparvata* on June 25th. *Pseudoterpna pruinata*.—July 16th. Storrington. *Iodis lactearia*.—May 26th. Patching. *Hemithea strigata*.—May 31st. Patching and Clapham. *Acidalia dimidiata*.—July 14th. A number beaten out of *Clematis* on High Down Hill. *A. virgularia*.—June 22nd. Common at Worthing. *Eulype hastata*.—May 22nd. Not common; about birch in Woods near Angmering and Patching. *Xanthorhoe rivata*.—June 28th. One specimen netted in a chalk pit near Lancing. *Melanthia procellata*.—July 14th. Several beaten from *Clematis* on High Down Hill. *Asthenia candida*.—First brood, May 22nd; second brood, August 5th. Angmering, Clapham and West Burton. *Minoa murinata*.—May 11th. Seen on the wing in a wood near Arundel. *Perizoma affinitata*.—May 22nd. A few beaten from bushes in woods near Angmering and Patching. *P. flavofasciata*.—May 26th. Patching. *Dysstroma (Cidaria) citrata (immanata)*.—July 14th. Angmering. *Anaitis plagiata*.—First brood, May 21st; second brood, August 5th. Clapham, Patching, and Steyning. *Mesotype virgata*.—July 24th. A solitary specimen of the second brood netted in a chalk pit near Lancing. *Ortholitha plumbaria*. June 25th. Only met with in a heathy hollow on the Downs near Sompting. I took one ♀ with the black central spot on the forewings obsolete. *O. bipunctaria*.—June 28th. Common on the chalk in many localities. *O. limitata*.—July 19th. On the Downs near Lancing and Edburton, and by the sea near Goring. *Eupithecia abbreviata*.—One specimen seen in April on a paling by some holm-oak trees at Worthing. *E. sobrinata*.—August 7th. Abundant amongst juniper near Sompting. *E. pumilata*.—July 16th. Storrington. *Herbula cespitalis*.—Observed on the slopes of the Downs. *Ebulea crocealis*.—July 24th. Several met with in a chalk pit near Lancing. *Spilodes palealis*.—A search amongst wild carrot and on the flowering heads of thistles near-by, in a rough meadow near the sea at Goring, produced five specimens of this insect.

SCIENTIFIC NOTES AND OBSERVATIONS.

NOMENCLATURE.—POLYOMMATUS ICARUS.—In *Ent. Rec.*, vol. xxxii., p. 191, I recorded the capture in May, 1920, of the *ab.* figured in South's *Butterflies*, plate 119, fig. 5, at the same time enquiring its correct name, to which the reply was that it is usually identified with *ab. persica*, Bienert, but is separated tentatively by Tutt as *ab. obsoleta*.

In the article in this month's issue of *Ent. Rec.* (vol. xxxiii.), on

the "Butterflies of N.W. Persia," by Mr. P. A. Buxton, the latter remarks under the heading *Polyommatus icarus*, page 32, as follows:—

"The race generally known as *persica*, Bienert, is that of the Persian plateau; Tutt has shown that Bienert's name *persica* can only apply to a rare aberration, which is of no geographical significance, and it appears that the plateau race referred to as *persica*, Bien., by many authors, from Butler to Le Cerf, should be called *fugitiva*, Butler."

To amateur entomologists, whose spare time is not sufficient to allow them to investigate the history and system of the nomenclature of Lepidoptera, an article in an early forthcoming number of *Ent. Rec.*, dealing broadly with the general conditions under which the existing system of the nomenclature of Lepidoptera has grown up would certainly be of great interest and assistance.

Taking, for the sake of example, the above case of *Polyommatus icarus*, the line of thought that presents itself to the writer as one of the aforesaid class of amateurs, is somewhat as follows:—

Presumably the name *persica* was first given by Bienert to that particular race* or form of *icarus* which most generally occurs in Persia, seeing that the name itself implies an intention on the part of its author that it should indicate that particular geographical area, while on the other hand the name in itself most certainly does not indicate any intention on the part of that author that it should be applied to a mere aberration of no particular geographical significance.

(a) What then is the exact system or authority under which it has been decided that Bienert's name *persica* was not intended by him to indicate the normal form of *Polyommatus icarus* as occurring in Persia, but that what he really intended to indicate was the rare aberration above referred to.

(b) If he did intend it only to apply to that ab., why did he use the name *persica* if the ab. occurs in other geographical areas than Persia?

(c) How, or under what rule or theory of nomenclature, does the name of the Persian race of *icarus* come to be altered to *fugitiva*, seeing that the original name *persica* seems to be so much more appropriate?

(d) Why has the name *obsoleta* been suggested for the variety or aberration when the variety is still extant and obtainable?

(e) Are the specimens of the before mentioned variety which are taken in this country emigrants from Persia, or are they aberrations of the English race of *Polyommatus icarus*?—R. BARNARD CRUICKSHANK, Alverstoke, Hants. February 22nd, 1921.

[If Tutt's *Brit. Lep.*, vol. xi. (*Brit. Butt.*, iv.) be consulted under the indices *persica*, *fugitiva*, *obsoleta*, there will be found a very full, complete, and to me satisfactory, discussion of this case.—Hx. J. T.]

NOTES ON COLLECTING, Etc.

DYTISCID LARVÆ AS FOOD IN BURMA.—The Deputy Commissioner of Lower Chindwin Dist., Monywa, Burma, recently sent the Indian Museum two large boxes containing the larvæ of a Dytiscid, and a

* [No. "this is a very distinct aberration," Bienert. The italics are mine.—H.J.T.]

number of adult beetles, collected in the lake at Twin, where they appear during the rains in exceedingly large numbers. I have identified the beetles as *Unectes griseus*, Fab., and the larvæ probably belong to the same species. The interest of the donation lies in the fact that these larvæ are eaten by the natives of the district, probably under the impression that they are small shrimps. I am informed that Dytiscid larvæ, collected from ponds, are also occasionally eaten by the natives of various districts in India.—CEDRIC DOVER, Calcutta, India. *January 13th, 1921.*

A MANSFIELD MIXTURE.—My son made a special journey to Sherwood Forest in March, 1920, on purpose to obtain melanic *Phigalia pedaria* for breeding purposes, but he only took one melanic female. There were plenty of types of both sexes. The melanic female deposited a nice batch of ova, which hatched out in due course; they fed up well on hawthorn, and I was in great hopes of rearing some melanic forms from them. The first to emerge was a rather small typical male, on December 22nd. They continued by single specimens to emerge daily, but all males, till on December 30th one typical female emerged, but on January 29th, 1921, they came out with a rush. About thirty came out, sexes about equal in number, males typical, but six of the females were melanic. These I have placed with six of the best marked males, to try my luck again in breeding melanic forms.

The larva of *Halía wawaria* were rather common in some gardens, and a second brood was produced. I took the first one on September 24th. They rather increased in numbers up to the end of September. I took eight specimens and took out eight of the summer brood from my series and replaced them by eight of the September brood, on the whole they are rather smaller than the summer brood. On the evening of September 30th one flew into the kitchen and made a most determined attempt to offer itself up as a burnt offering at the kitchen light. At last it effected its purpose, I hope to its own satisfaction; there was just enough of its cremated remains to prove it had been *Halía wawaria*.

Larvæ of *Abraxas grossulariata* were not so numerous as usual; those I fed up from my own garden did not produce me any vars., but I had better luck from larvæ I collected from a currant bush growing wild in a fence, for one produced a nice form, the black on the wings was normal, but the wings are dusted over with most minute black atoms, which give it a very dusty look. It is one of my best vars. I think it is rarer than the form *varleyata*.

The gooseberry sawfly larva was a pest, it did not give the larvæ that fed on the gooseberry foliage, such as *H. wawaria* and *A. grossulariata*, a chance to feed. I found the best way to settle their account was to give the main stem of the tree on which they were feeding a good sharp blow with the handle of a spade or fork, the more sudden the blow the more effective it proved in dislodging the larvæ, and have ready some quick lime and throw it over them.

I think the only larva that occurred in its usual numbers in my garden was that of *Plusia moneta*. In 1920 I took about two dozen larvæ and cocoons; the larvæ are the easiest to get through to the imago that I ever kept, they are similar to pigs, only give them plenty of food they will thrive and hasten their own end.

The ova are placed on the young flowering spikes of the monkshood, and in 1919 I had three small lots on the spikes, in small webs, but I found that they wandered away after the first moult if there were any Delphiniums near. In 1919 I was very puzzled by the disappearance of the larvæ, I thought the birds had made a discovery, but I soon after solved the puzzle by finding both the full fed larva and the cocoons on the underside of Delphinium foliage. The Monkshood and Delphiniums grow close together in my garden. I do not take the trouble to look for them in the first stage, but if any friend requires a few I now look for them in the advanced stages. I have never found them in the webs on Delphinium. During the last season I have not seen either a *Vanessa io* or *Euchloe cardamines*.—WILLIAM DAWS, 39, Wood Street, Mansfield, Notts.

CURRENT NOTES AND SHORT NOTICES.

The Entomological Society, London, held its inaugural meeting in its new premises on March 2nd, when quite a hundred Fellows and their friends were welcomed by the President, the Rt. Honble. Lord Rothschild, M.A., F.R.S. General satisfaction was expressed at what had been done by the Housing Committee of the Society. A large number of exhibits were discussed and after the usual conversazione, tea, etc., in the spacious library, the meeting closed at a late hour. For a time the Library of the Society will be closed to borrowers during the rearrangement, although visitors may even now be able to consult the section devoted to periodical magazines, most of the volumes of which have been placed.

In the *Ent. News* for November last is the report of an occurrence of what we may term a case of pseudophoresy. Mr. Mann of the U.S. Bureau of Entomology, Washington, recently received "specimens of *Mallophaga*, several of a small species of *Gyropus*, and one of *Tricodectes*, which he found at Quebrada La Camelia, Colombia, attached to a dragonfly, *Ischnogomphus jessei*." *Gyropus* species are said to live exclusively on small terrestrial rodents, and the dragonfly has a habit of alighting on the ground and on low objects, hence we must infer that the insects became attached when the dragonfly may have settled on a dead rodent.

In a note on Mental Attitudes towards Insects the Editor of the *Ent. News* gives a personal illustration. He had been trying to realise what must have been the mental attitude of many a cultured Egyptian, Greek, or Roman towards insects, when the local butcher came. The Editor continues, "His business transacted, the butcher observed that the coming winter was likely to be cold only in the latter part—because he had been feeling the caterpillars along the road and they were hard to the touch *only at their hind ends*."

In the November number of the *Can. Ent.* there is a very interesting account of the life-history and metamorphoses of a "stick-insect," *Diapheromia femorata* (*Phasmidae*), found defoliating oak, basswood and hazel in Quebec. There is an illustration of the curious manner of copulation; full details of the oviposition and early stages are given at length.

SOCIETIES.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

November 15th, 1920.—NEW MEMBERS.—Mr. G. H. E. Hopkins,

Shevington Vicarage, nr. Wigan, and Mr. A. R. Davidson, Foster Road, Formby, were elected members of the Society.

PAPER.—A paper was read by Mr. S. Gordon Smith, F.E.S., entitled "A year's collecting of Macro-Lepidoptera." In this most interesting paper Mr. Smith related his experiences in pursuit of Lepidoptera from the autumn of 1919 until October of last year. Delamere Forest came in for a good deal of attention and by persistent hard work Mr. Smith has obtained some lovely sets of variable insects; he shewed that *Nyssia hispidaria*, previously considered rare in the forest, was quite a common insect, and had further established, by counting a large number of moths on the trees, that *Phigalia pedaria* var. *monacharia* occurred in the proportion of about one to three of the type in this locality. A large part of the paper was taken up with the results of breeding; large numbers of the larvæ of the *Vanessidae* in particular passed through the cages and yielded some fine varieties. Probably the most interesting section of the paper was that dealing with the visitors to electric light. The author had installed a 2000 C.P. lamp on the balcony of his house overlooking the River Dee, and the flat, open country beyond. Records of temperature and weather were kept and their bearing on the number of insects noted. *Thamnonoma brunneata*, *Acrionicta albi* and its black aberration, *Cirrhoedia xerampelina* and *Dicranura furcula* were among the species that came to light. A discussion ensued in which Professor Newstead, the Rev. F. M. B. Carr, and Mr. Wm. Mansbridge took part. A vote of thanks was carried by acclamation.

ABERRATIONS OF BRITISH LEPIDOPTERA.—Mr. Carr exhibited a variable series of *Peridromia saucia*, also of *Xanthia ferruginea*, *Calocampa exoleta* and *C. vetusta*, all taken in his garden at Alvanley on sugar and rotten fruit, and from Prince's Risboro' a series of *Thera juniperata*.

December 20th.—ANNUAL MEETING.—ADDRESS.—The President read an address entitled "The Lepidoptera of Wicken Fen"; he also exhibited series of insects in illustration. Other exhibits of Fen insects were made by Messrs. Wm. Mansbridge, C. P. Rimmer, and S. Gordon Smith.

NEW MEMBER.—Mr. J. B. Garner-Richards, the Liverpool Collegiate School, Shaw Street, Liverpool, was elected a member of the Society.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

December 9th.—NEW MEMBERS.—Mr. J. J. Joicey, F.E.S., The Hill, Witley, Mr. G. Talbot, F.E.S., The Hill Museum, Witley, Mr. A. J. Wightman, 35, Talbot Terrace, Lewes, and Mr. L. Ford, Park Hill, Bexley, were elected members.

Mr. Sperring exhibited a Cassid, *Aspidomorpha* sp., from Central Uganda.

Mr. Main made a series of remarks on the keeping of ants in artificial formicaria.

Mr. A. A. W. Buckstone, further series of dwarf *Agriades coridon* from Surrey and a second brood of *Euphyia picata*.

Mr. Bowman, aberrations of *Polyommatus icarus* from Folkestone.

Mr. B. S. Williams, *Bithys quercus* ab. *major* from Cornwall and an asymmetrical *Coenonympha pamphilus*.

Mr. Goodman, a pupa of *Hyles euphorbiae* from a Courmayeur larva.

Mr. K. G. Blair, ab. *parvipuncta* of *Rumicia phlaeas*.

Mr. R. Adkin, a series of *Ptychopoda dimidiata* (*scutulata*) with their cocoons; and read notes on the pupation, showing the natural position to be among rubbish on or near the surface of the ground.

Mr. Hy. J. Turner, a small collection of butterflies from W. Java, notable for brilliant Pierid species.

Mr. Adkin, the Society's Delegate to the Conference at the British Association, read a short report of the Meeting.

REVIEWS AND NOTICES OF BOOKS.

Le Monde Social des Fourmis du Globe comparé à celui de l'Homme.
By Dr. Auguste Forel, Geneva, Librairie Kundig, Editeur. *Tome Ier*, 1921. Pp. i.-xiv. and 192; 2 coloured plates, 1 black and white plate, and 30 figures in the text.

The first volume of this interesting and comprehensive work on the ants of the World has been sent to us to review. The book will be completed in five volumes, and we advise all students, not only of Hymenoptera, but of Entomology in general, who can read the French language to obtain it as soon as possible. The price 10 francs a volume (which is very moderate especially taking into consideration the great cost of publication everywhere at the present time) should bring the work within the reach of everyone.

Volume I. deals with the genesis of ants, their anatomy, general classification and geographical distribution.

Chapter I.: Phylogeny (evolution of the species of ants of the geological epochs up to the present day).

Chapter II.: Ontogeny (evolution from the egg, and larva to the adult state). Polymorphism (the three or four kinds of individual adults).

Chapter III.: Exterior anatomy (skin, hairs, sculpture, limbs).

Chapter IV.: Interior anatomy (digestive canal, nervous system, brain, glands, muscles, etc.).

Chapter V.: General summary of Classification.

Chapter VI.: Geographical Distribution. Migrations ancient and modern, local faunas.

Chapter VII.: Fossil Ants.

The beautiful coloured plates as well as all the other illustrations both original and reproductions are by Mons. E. W. Heinrich and deserve great praise.

The arrangement of the figures in the text is not good, and gives considerable trouble to the student. The figures are not in order but dotted about all over the book; for example—Fig. 20 is on page 115, but Fig. 22 is on page 49; Fig. 25 on page 43, etc. ! Then in the text when one is told to see Fig. "so and so," one has to turn to the index and find out on which page it is, and then turn for that page, and lose one's place, and the sequence of one's thoughts, etc.

It is not our purpose here to discuss the whole work in detail, nor would the space at our disposal allow of it. We can only touch on a very few points; but the reader may rest assured that every problem concerning ants is mentioned and expounded by the author.

In the preface the author gives a short account of his earliest experiences with ants at the village of Lonay près de Morges, where he spent the first eight years of his life. He also records that at the age of eleven he was given Pierre Huber's work on the habits of ants,

which explained many things he had already noticed himself. From that time he determined to become a Historian of ants all his life—a resolve which he has always kept.

It is with regret we notice in a list of names of myrmecologists (p. xiv.) to whom the author says the science and he himself owes much, that only one Englishman is mentioned [he being a big game hunter and not a myrmecologist]; this we trust is only an oversight.

The author considers that the *Ponerinae* is the most ancient subfamily, and the other subfamilies are directly descended from it. This is the view we hold ourself, though it is not the one held by all the first myrmecologists.

Forel states the male ant only lives a few days; perhaps it is a little hypercritical to dispute this statement, as he is probably speaking generally, or in comparison with the lives of workers and females. Nevertheless male ants can be kept alive for months after the marriage flight as we have shown (*British Ants*, p. 27), and this can also take place in nature (*l.c.*, p. 207).

As fecundation only once takes place in the life of a female ant, Forel calls the female a kind of secondary hermaphrodite, who fecundates herself every time she lays.

In referring to the rapidity with which, and the vast areas over which, *Iridomyrmex humilis* has spread in recent times the author says, it has already been recorded from the centre of France. In *British Ants*, p. 342) we have shown that it occurred as a considerable pest in Belfast in 1900, and that it had been sent to us from Edinburgh in 1912. Since this was published we have received it from Enfield; Eastbourne, where we understood a number of houses have been practically rendered uninhabitable by it, and Guernsey.

In the chapter on Fossil Ants references are made to most of the writings on the subject, including that of Westwood in 1854, who the author remarks made many mistakes. He however does not appear to be aware that nearly all the British fossil ants have recently been described and brought up to date—see Cockerell *Proc. U.S. Nat. Mus.* 49 483-86 (1915); *Ann. Mag. Nat. Hist.* (s.9) 6 277-78 (1920); Donisthorpe *Ann. Mag. Nat. Hist.* (s.9) 6 81-94 (1920).

In bringing this short notice to a close we quote one or two remarks of the author's, which it may be hoped will encourage more students to take up the study of ants—the most fascinating of all insects.

“Let us grant at once that the detailed anatomy of the eggs and larvæ of ants is still to be made.”

“Is there enclosed in the egg (as with Termites) the power or the structure to differentiate the diverse polymorphic forms which spring from it? It is possible, but it is not yet proved.”

“Nothing has yet been proved to show if all the eggs of an impregnated female are fecundated when laid, or if some of them are not fecundated.”

“I repeat that the anatomical and ontogenetic study of ants is still nearly entirely to be made, and we do not know where and when the differences of the individual polymorphic ♀, ♂, ♀, 4, commence with them.”

“Here is a metamorphosis as complete as possible, but the anatomy of this transformation is not yet known; that is to say the details of its ontogeny. Here again is a world to be discovered, a world in which the larval body is transformed in a few days, into a body ready to become an ant.”—HORACE DONISTHORPE.

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CHANGE OF ADDRESS.—S. G. C. Russell, "Roedean," The Avenue, Andover Junction, Hants.

Mr. Donisthorpe will still be glad to receive ants and Myrmecophiles from all parts of the British Isles, and to name any such for anyone who is kind enough to send them to him. He would however suggest that ants from any other parts of the world be sent to his colleague, Mr. W. C. Crawley, 29, Holland Park Road, W. 14. Mr. Crawley is specialising on the ants of the world, and it is a matter for congratulation that we should possess an Entomologist in this country whose whole attention should be concentrated on this branch of Entomology.

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. 1921, March 16th; April 6th; May 4th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street, E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. (No Meetings in July or August.) Visitors welcomed. Hon. Sec., W. E. GLEGG, 44, Belfast Road, N. 16.

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A week at le Mont Dore.

By G. T. BETHUNE-BAKER, F.L.S., F.Z.S., F.E.S.

After long abstinence from Continental travel my wife and I looked forward with much pleasurable anticipation to a sojourn in "la belle France," having made up our minds to spend most of our holiday in Provence.

A short stay, however, at le Mont Dore—Auvergne—might prove a pleasant half-way house and a very convenient locality wherein to take a brief rest before going further afield and setting to work on the Lepidoptera of southern France.

Le Mont Dore is one of the greatly frequented "watering" places on the other side of the channel, for it possesses a sumptuously arranged "établissement thermal," which is famed for its hot sulphur springs as also for other kinds of medicinal waters. It is an easy journey from Paris, for we left there at 8 p.m. and arrived at our destination at 6 in the morning.

Our first day was dull and cool and slightly rainy, but after eleven o'clock the drizzle ceased. This was the only grey day we experienced during our trip which lasted about nine weeks. The next day, June 20th, was brilliant and very warm, and we took a walk in the morning up the side of the hill towards "le Capucin," a high dome shaped summit 4,800 ft. high, and in the afternoon a walk up the hills on the opposite side brought me to a high mountain pasture about 4,000 feet, where *Erebia epiphron* was not uncommon. The only ♀ taken is of the *cassiope* form with white pupils, the males, however, were variable, some with the black spots reduced to mere points, or with only two sub-costal black spots, whilst others had the full complement of four well marked spots on both wings. *E. stygne* was common everywhere, and these were the only two *Erebiae* I saw. *Heodes hippothoë* was just emerging in first class condition and generally of the typical form, though I took one female almost of the var. *eurybia*, but with the spots elongated into sub-sagittate dashes. *Ino statice* was common in both sexes on the scabious flowers. Insects generally were by no means plentiful, but the reason was not far to seek, for the general formation is, I think, granitic, though the height of the village (le Mont Dore) is not more than 3,400 ft., yet the aspect facing north is cold, and June the 20th to the 26th was evidently too soon for any except quite the early emergences. I was specially desirous of obtaining *Zygaenidae*, but not one did I see of the genus *Zygaena*, though I searched assiduously both in the valleys as well as on the hillsides.

The scenery is delightful, and a glorious excursion by automobile past Lac de Guéry to the village and wonderful old church of Orcival, on through the famous gardens of Chateau Conde will not easily be forgotten. The church, a double storey one, has the same accommodation below as on the ground floor, for it is possessed of a large, interesting crypt that provides this curious arrangement—perhaps the thing that struck one most was the brand new statue of the recently made Sainte Jean d' Arc, which was in every church we visited. The country we passed through, all too quickly alas, contained some of the most beautiful sub-alpine views that I have seen, fortunately on our way back we were able to stay a short time at the Lac de Servières

APRIL, 1920.

partially surrounded and sheltered by a belt of firs and pines of various sorts, where I again took *Erebia epiphron* and here captured the type as well as the variety *cassiope*, as also the *hospita* form of *Parasemia plantaginis*. On another day we went to the Puy de Sancy 6,185 feet high, and the highest mountain in Central France. My wife remained in the meadows at the immediate foot, whilst I made a most interesting ascent, *Brenthis euphrosyne* was quite fresh and I took my first *Colias croceus* (*edusa*) in this district, but as I mounted higher insects became scarcer and soon *Psodos quadrifaria* put in an appearance, the first herald of the approach to Alpine conditions. *E. epiphron* was of course again on the wing, and soon after I encountered the first small patch of snow, and on rounding the shoulder of an outlying buttress there lay in front of me and above a great mass of some largish yellow flower that was too far off to decipher though it was a lovely sight gleaming in the sun, but it was not long before I crossed the rocky intervening distance and then I found a meadow of daffodils in full flower, the deeper yellow cup being quite hidden by the primrose leaves of the calyx until one came quite close, after this more and more abundantly did they appear up to perhaps 5,000 feet or thereabouts, but above this they gradually became scarcer and scarcer, and the true Alpine flowers began slowly to show themselves; it was indeed a pleasure to see *Gentiana acaulis* after so many years absence from the higher Alps. *Parasemia plantaginis* and its white form *hospita* soon fell to my net, both taken near together, but as I neared the summit butterflies disappeared with the exception of a stray *Aglais urticae*, which I captured for the sake of the locality. Then came the final stony stretch leading to the top, from whence a splendid view is obtained north and south, and east and west. Here, right on the summit and also on the knife edge southern ridge and just below it was one of those clouds of ants we occasionally see in their winged state, which settled temporarily on one by the dozen; all around the swifts were busy in very large numbers, and so intent were they on the abundance of food that they were quite regardless of my presence; to and fro in silence they winged their way, ever and anon circling around me, and so close did they often fly that the movement of the air was quite perceptible on my cheeks as their wings clove the air "en passant." Anemones were abundant immediately below the summit, an occasional sulphur one past its best was now and then seen, but the white were in abundance, some going over and others in all stages of growth, so that they made me quite rejoice at once again being in an Alpine region. The stay, however, was too short and the region too small to procure the wished for Alpine fauna, and so reluctantly the descent had to be made and nothing fresh was added to my list except more *Erebia stygna* and *Adopaea flava* (*thauwas*), together with one or two species of the *Botyidae*.

Another day was devoted to the Pic du Capucin, up the first few hundred feet of which a funicular railway is run to the fashionable tea gardens of the locality, where a small pasture beautifully surrounded by wooded eminences is turned into skating rinks, and café restaurants and all sorts of temptations wherein to wile away your time and part with your money—and my wife preferred to rest under the pleasant shade of the trees whilst I faced the sun to complete the

ascent. A much softer mountain is Capucin (4800 feet) than the Puy de Sancy, for all its dome shaped Pic is green to the summit, with grassy slopes and bilberries and all sorts of low growing plants. Here I took *Parnassius apollo*, and the only one I saw during my week's sojourn; *Trebia stygine* and *E. epiphron*, again the only ones of their genus, were not uncommon, *Coenonympha pamphilus* was also taken and a few Geometers as yet unnamed; *Brenthis euphrosyne* was in fine condition and also of considerable size, a few *Issoria lathonia* occurred and one or two *Melitæa parthenie*, whilst *A. flava* (*thaumas*) was rather rare.

On the other side of the valley much the same sort of captures were made, only there, in a stony locality, *Pararge maera* and its form *adrasta* were not uncommon, perhaps the *adrasta* is scarcely typical, but it belongs to that race rather than to the parent stock. A single *Aphantopus hyperantus* was taken on this side of the valley. The *Hesperiids* were, however, very scarce, only three *Augiades sylvanus* fell to my net and but one *Hesperia fritillum* race *cirsii* and one *H. malvae*. Of Noctuæ I took but two, *Euclidia glyphica* on the wing and a beautiful black Noctuid, as yet unnamed, at rest close by the grand cascade. Perhaps I ought also to record a single specimen of *Crambus digitellus* on the Puy de Sancy.

The extraordinary paucity of species is worthy of note, there was almost a complete absence of the *Plebeinae* and *Polyommata*, for I only took two specimens, both of which attracted my attention by their extraordinary appearance, they were evidently blues, but what? They had no colour at all and when I boxed them they were too worn to decipher, now that they are set I find they are absolutely scaleless in all the internervular areas, there being only a vestige of the lower layer of brown scales along the veins of the wings. The genitalia tell me they are *Polyommatus eumedon*, but it is quite impossible to determine them by their pattern. As I look at them now I ask myself is it possible for a *Plebeine* to hibernate. I suppose it is not possible, but the abnormal condition of these two specimens in mid-June compelled the thought.

From here we went on to Provence where we spent the remainder of our holiday, our next resting place (apart from single nights) being la Sainte Baume, but this must be deferred for a later paper.

A new Palæarctic species of the Lyceninae.

By G. T. BETHUNE-BAKER, F.L.S., F.Z.S., F.E.S.

Lt.-Colonel H. D. Peile, who has returned home recently after spending some time in Mesopotamia with the army of occupation, has brought a most interesting collection of Rhopalocera from that region and among them is an extraordinary and beautiful new *Lycenid* belonging to the *dama* section of the genus *Polyommatus*, which I have much pleasure in dedicating to its fortunate captor.

Polyommatus peilei, sp.n.—♂ Both wings yellowish tawny colour (the exact colour is very difficult to describe, at first sight it looks almost orange), the prevailing tone is deep yellowish. Primaries with an abundant supply of greyish androconial hairs and small scales, which give the wing an unusual aspect. The secondaries are almost free of these scales except in the basal area. Fringes grey, the basal

half being darker than the terminal portion. Underside. Both wings cream colour with a slight pinkish tinge, with blackish spots palely encircled. Primaries with a dark crescent closing the cell, a postmedian line of six spots, the lowest one being double, those in the radial area are excurved, the fourth and fifth spots recede sharply basewards, the sixth (double spot) is shifted outwards.

Secondaries, with all the spots very small and inclined to obsolescence, but the two sub-costal ones, *viz.*, that near the base and that half-way along the costa, always present and definite though small, the spots in the postmedian row are reduced to mere points and are often absent, there is a trace of a submarginal row of dashes of the ground colour edged with a tone of cream colour paler than the ground.

♀ Pale brown colour, otherwise like the male on the underside. Expanse ♂ 38.42, ♀ 38 mm.

Habitat, Karind Gorge (N.W. Persia), 6,000 ft. July (H. D. Peile). Types in the British Museum, six ♂ ♂ and one ♀.

The Karind Gorge is just over the Persian frontier.

Lt.-Colonel Peile has generously and patriotically presented the types to the National Collection whilst he has also been so good as to give me a specimen.

It is I think the most extraordinary Palaearctic species of the true *Lycaeninae* that I know, its colour separates it from everything, but the underside pattern shows it to be a near ally of that beautiful species that Staudinger called *dama*, with which indeed it was flying when Lt.-Colonel Peile captured it. The androconial scales also connect it closely with the *dolus* group.

Cionus woodi: a Species of Coleoptera new to Science; with a Table and some Remarks on the British Species of Cionus.

By HORACE DONISTHORPE, F.Z.S., F.E.S., etc.

The Rev. Canon Wood asked me to try to identify a couple of specimens of a large species of *Cionus*, which he had taken by sweeping on the shores of Lake Windermere in 1914, and which he had been unable to make agree with any of our known British species. Having failed to name the insect with any of the books I could get hold of, or from specimens at the British Museum, I sent one of the specimens to Major Sainte Claire Deville for his opinion. He returned it to me remarking that he had never seen anything like it before, and that it did not agree with any species in the latest work on *Cionus* by A. Wingelmüller, "Monographie der Palaarktischen Arten der Tribus Cionini." [Münchener Koleopt. Zeitschr. 4 166-237 (1914)].

I have to thank Mr. G. K. Marshall who has recently acquired this work, for kindly lending it to me.

Superficially this new species bears a close resemblance to our two species *C. scrophulariae*, L. and *C. tuberculatus*, Scop.; but it would not come in the same section in Wingelmüller's table.

In his table it runs down nearest to *Cionus longicollis*, Bris., var. *montanus*, Winglm., from which however it is abundantly distinct. According to Wingelmüller his var. *montanus* is the insect we have

called *longicollis*, Bris., in all the British records of the same. He states that the typical form only occurs in the western Mediterranean region, *i.e.*, in the South of France and Spain. The var. *montanus*, which he described in his paper (pp. 195-6), extends over the mountains and hilly parts of Austria and Germany, but appears to entirely fail in the plains. He possesses a pair of the so-called *longicollis*, Bris., from Portsmouth, and he says these are his var. *montanus*, which is a larger and more robust insect than the type.

I have described the new species, which I have called *woodi* in honour of its discoverer; and have drawn up a simple table of all the British species of the genus to fit in with that of Fowler, including both the new species, and the var. *montanus*, Winglm., of *C. longicollis*, Bris.

TABLE OF THE BRITISH SPECIES OF CIONUS.

- I. Prosternum concave and deeply incised on its anterior margin, second joint of funiculus of antennæ elongate, as long as the first.
 1. Elytra with two common circular black velvety spots, one before middle, and the other at apex.
 - A. General colour of elytra black.
 - a. Thorax furnished with thick pubescence.
 - aa. Thorax entirely covered with thick yellowish-white pubescence *C. scrophulariæ*, L.
 - bb. Thorax with sides only clothed with thick yellowish-white pubescence; disc bare *C. tuberculatus*, Scop.
 - b. Thorax without pubescence; only sprinkled with very small scales *C. woodi*, sp.n.
 - B. General colour of elytra grey or greenish-grey.
 - a. Rostrum roughened and pubescent nearly to apex in both sexes.
 - aa. Elytra longer, more parallel-sided; legs and rostrum thicker; insect larger, more robust *C. longicollis*, Bris., var. *montanus*, Winglm.
 - bb. Elytra shorter, less parallel sided; legs and rostrum less thick; insect smaller, less robust *C. thapsus*, F.
 - b. Rostrum with distal half smooth and shining in ♀ *C. hortulanus*, Fourc.
 2. Elytra with a large irregular patch behind scutellum and a sharply defined circular spot at apex, black; the former often more or less brown; prevailing colour of elytra white *C. alauda*, Hbst. (*blattariæ*, F.).
- II. Prosternum not excavate before anterior coxæ nor excised on its anterior margin, (*Cleopus*, Steph.); prevailing colour of elytra brown, with three longitudinal patches at scutellum, a transverse fascia behind middle, and a small spot before apex, brown *C. pulchellus*, Hbst.

Cionus woodi, sp.n.

Rostrum black, reddish at apex, long, slightly curved, a little broader at apex, rugosely longitudinally punctured nearly to apex in both sexes, longer in ♀ than in ♂, furnished with sparse golden hairs after insertion of antennæ, which are slightly more abundant in ♂. Antennæ reddish, with darker club, inserted beyond the middle of rostrum, slightly nearer the apex in ♂. Head black, longitudinally punctured, clothed with sparse yellowish scale-like hairs. Eyes black, large, flat.

Thorax black, somewhat shining, closely and finely punctured, superficially entirely bare, but under the microscope it is seen to be sprinkled all over with very small flat roundish yellow scales. *Elytra* much broader than thorax, with well marked shoulders, which are reddish at apex; striæ with deep large round punctures; interstices with fine very close punctures, the 4th interstice with coarse irregular punctures on apical half, 6th interstice broadly dilated behind middle and with numerous coarse punctures on apical third, 8th interstice with coarse punctures on apical third; alternate interstices elevated and furnished with longitudinal deep black velvety patches of hairs, and alternate golden scale-like hairs; the sutural and apical circular spots, which are large and of the same size, are covered with the same deep black velvety hairs as those on the interstices. The general ground colour of the elytra is brown with a slight violet tinge. The *scutellum* is fringed with golden hairs, as are also the two circular spots, more especially at the base. *Legs* reddish, furnished with golden hairs; intermediate and posterior femora with very strong teeth. Underside of breast black, sprinkled with similar scales to those on thorax. *Abdomen* black, closely punctured, and furnished with sparse golden hairs. *Long*, 4.5-5mm. without rostrum. ♂ with rostrum 5mm., ♀ 6.2mm.

Described from a ♂ and ♀, taken by the Rev. Canon Theodore Wood on the shores of Lake Windermere.

DISTRIBUTION, ETC., OF THE BRITISH SPECIES OF *CIONUS*.

Cionus scrophulariæ, L., occurs on *Scrophularia aquatica*, *S. nodosa*, and *Verbascum thapsus*. It is widely distributed in England, Scotland, and Ireland. I have taken it in the New Forest, and at Weybridge, etc., in June.

Cionus tuberculosus, Scop., in marshy places on *Scrophularia aquatica*, *S. nodosa*, and *Verbascum*. Fowler gives the following localities:—Hammersmith, Notting Hill, and Battersea Fields; Merton, Barnes, Ripley, Wimbledon, Lee, Greenwich, Cowley, Forest Hill; Hertford; Hastings district; Glanvilles Wootton; Swansea, Bretby Wood near Repton; Scotland "Dollar," Forth district. In the supplement we add Kingston-on-Thames; Newbury; Scotland, Loch Fochan, Argyllshire. I have only once taken this species, when it was not uncommon on *Scrophularia aquatica* at Kingston-on-Thames, June 19th, 1896.

Cionus thapsus, F. On *Scrophularia nodosa* and *Verbascum thapsus*. Decidedly rare. Fowler gives Mickleham, Portsdown, Glanvilles Wootton, and Llangollen. The supplement adds Streatley, Berks, and Framingham Pigot, Norfolk. I believe it to be more partial to the black Mullein *Verbascum nigrum*, on which plant I took it in numbers on August 22nd, 1906, when in company with P. Harwood at Streatley.

Cionus longicollis, Bris. var. *montanus*, Wnglm. This sub-species has occurred at Portsdown Hill, Portsea; Harewood Forest; and Barton Mills. In the last locality it is very abundant on *Verbascum thapsus*. I have taken it there in May, September and October 1917 and 1920. I sowed seeds of the plant in my garden at Putney in 1917, some of which came up in 1920, and I introduced a number of the beetle on to them. It will be interesting to see if the insect will survive in its new home.

Cionus hortulanus, Marsh. On *Scrophularia nodosa* and *Verbascum thapsus*; widely distributed from Norfolk and the midland districts southwards. Langworth Wood, Lincoln, appears to be the most northern locality and it has not been found in Scotland. Ireland widely distributed. I have taken it in June, July and August in the New Forest; Hastings district; Richmond Park, etc.

Cionus alauda, Hbst. (*blattariae*, F.). On *Scrophularia aquatica*, *S. nodosa*, and *Verbascum nigrum*. Generally distributed and not uncommon from Norfolk and the Midlands southwards, rarer further north, Yorkshire, Northumberland, Durham. Scotland scarce, Tweed and Forth areas.

I have taken it in June and August at Oxted, Battle, Sevenoaks, etc., etc.

Cionus (Cleopus) pulchellus, Hbst. On *Scrophularia nodosa*. Local: but widely distributed from Northumberland southwards. Scotland, rare, Solway district. Ireland, Kerry. I have taken it in May and July in Coombe Wood, Guestling Wood, Buddon Wood, etc.

Notes on Collecting Butterflies at Hong Kong.

By COMMANDER G. C. WOODWARD, R.N.

Hong Kong is situated about 70 miles inside the tropics. The island itself is about seven miles long by about four miles wide, and rises to a height of over 1,000 in the centre of the island.

The island is covered with dense vegetation, but there is nothing much in the way of very large trees, the great majority being small firs. The island is well looked after by the Afforestation Department, which prevents the natives cutting any timber, brush-wood, etc.

The mainland is mostly bare, owing to the habit of the natives of cutting down everything in the way of firewood as fast as it grows.

The seasons roughly divide themselves into a wet and a dry, the wet season lasting from April to October: during this period the weather is very hot and moist, with much rain, and the island is frequently visited by those very violent storms called typhoons, which sometimes do a large amount of damage. The curious feature about these typhoons is that they do not seem very destructive to insect life, as a very few days after the visit of one of these storms, butterflies appear again in the greatest profusion, and in an undamaged state.

The dry and cold season lasts from November to March, when the temperature is of temperate description, the thermometer falling rapidly sometimes down among the forties. These cold snaps sometimes last several days.

Generally speaking the wet season is the best for collecting Lepidoptera, April and May and again in September and October being the best months; but a spell of warm weather in the dry season seems to produce its quota of insects, of which a few seem to have different forms in the wet and dry season.

Among the most brilliant of the butterflies found in Hong Kong are those of the family *Papilionidae*. These splendid insects are well represented on the island. Among the common and most brilliant is *Papilio paris*; this insect I found to be abundant in the Happy Valley, where it flits about between the trees with a fairly rapid flight, occasionally stopping to feed at the flowers of *Lantana camara*, a very common shrub on the island, and of which most butterflies seem uncommonly fond. The commonest *Papilio* on the island is, I think, *P. helenus*. This insect appears everywhere, and seems to be the only *Papilio* found here during the dry season, when it sometimes appears, but is somewhat scarce at that time of the year. The largest species

of this family is *P. memnon*, which occurs fairly frequently in the more wooded parts of the island; it has a peculiar loping sort of flight, and is generally travelling much faster than it appears, when one tries to get it into the net.

The other species of the black forms of *Papilio* found here are:—*P. protenor*, *P. polytes*, which is common in most places, *P. bianor*, which looks somewhat like *P. paris* when on the wing, and *P. aristolochiae*, which is said to be rare, although I succeeded in obtaining three examples in one day at the Happy Valley; the Hong Kong specimens are of a much larger and brighter description than those of my collection from India and the Malay States. I think that this species may often be mistaken for the "red" female of *P. polytes*, which is of frequent occurrence here.

The next three species that I collected belong to the "Sarpedon" group, viz., *P. sarpedon*, *P. agamemnon*, and *P. euryпилus*. These insects are fairly common here, but have an extremely rapid flight, and one's only chance of netting them is when they are poised in front of a flower engaged in feeding, and even then the utmost caution must be observed in the approach, as once they are alarmed they are off like the wind.

Another strikingly handsome *Papilio* found here is *P. antiphates*, which occurs in the rainy season, but did not seem to me to be very common; I only found it during the month of July, on the mainland. *P. clytia*, in the black and white form, is also fairly frequent. This insect appears to mimic certain species of the *Danaidae*, which are of such common occurrence here. The last of the "swallow-tails" here is *P. demoleus*, a fairly common species, and found on waste pieces of ground.

From the foregoing list it will be seen that the genus *Papilio* is well represented for so small an area. It will also be observed that although Hong Kong is nearly outside the tropics, and has a temperate and sometimes quite cold winter, the species are nearly all tropical and not Palearctic.

I have not found that the Fam. *Pieridae* is so well represented as one would suppose. I only succeeded in obtaining nine species of this large family during my stay here, although I expect that there were other members of the family that I did not succeed in obtaining.

About the most brilliant of the Pierids I found was *Delias hierte*, which I discovered was uncommon, and when seen was generally flying at a great height around trees. *D. pasithoe* I noted in the month of February, it seemed local, but common enough when found. *Terias hecabe* is about the commonest insect here, it seems to be everywhere, flitting here and there low down over the ground. Other species I have collected here are *Ixias pyrene*, *Hebomoia glaucippe*, which generally flies fairly high up amongst the trees, and the two *Catopsilia*, *C. pyranthe* and *C. pomona*, both of which are common on waste ground.

Of the genus *Pieris*, *P. canidia* and *P. coronis* are the only two I have captured here, both of them very common at the right season. Among some of the more striking of the Lepidoptera found here are those of the Sub-Fam. *Danainae*, the commonest species being *Danaüs similis*, which abounds everywhere. The other species of the black and greenish Danaiids I have obtained being *D. limniace* and *D. septentrionis*, which, while fairly common, are not so frequently met

with as the first one. *D. plexippus* is a very common insect, and one that appears in the winter should the weather become warm enough. *D. chrysippus* is here, as elsewhere in the eastern tropics, very common.

The genus *Euploea* is well represented by individuals, these conspicuous insects being very abundant. They have a floating lazy kind of flight, and are quite easy to capture. The two species I found common are *E. midamus* and *E. anymone*.

The *Satyridae* are represented by the genera *Lethe*, *Mycalesis*, *Melanitis*, and *Ypthima*. Of the first-named genus, *Lethe europa*, is the representative, this insect is very common, especially round clumps of bamboo. Another insect extremely common in similar situations is *Mycalesis mineus*; it has a very weak and jerky sort of flight, and flits in and out among the undergrowth. Of the third genus the species found is *Melanitis leda*. I did not note it very commonly, and it appears to have two separate forms, one found in the dry and the other in the wet season. The last species is that extremely abundant little butterfly *Ypthima avanta*, which seems to turn up everywhere in the greatest profusion.

Among the *Nymphalinae*, there appears to be quite a large number of species found in Hong Kong.

Among the commonest is *Cupha erymanthis*, which I found likes to keep to the more wooded portion of the island: also *Atella phalantha*, which inhabits similar localities. Another pretty little butterfly found here is *Symbrénthia lucina*, but I think it must be rare, as I only saw one specimen. *Pyrameis cardui* occurs, as in most other places of the world, but not commonly. The genus *Precis* is well represented, I have taken the following, *P. orythia*, *P. almana*, two forms, one wet season and one dry, common; *P. lemonias*, common; and *P. oenone*. Of the last-named species I only took one specimen, so I conclude it is uncommon most years. Two species of *Neptis*, *N. eurynome* and *N. columella*, both fairly common; *Athyma nestes* and *A. perius*, both rather hard to capture. *Euthalia phemius* I found fairly commonly, it is fond of sitting on leaves of trees rather high up. Among the genus *Apatura* I noted *A. parisatis*, the ♀ more frequent than the ♂. I have nearly always taken it settled on the ground. Among the *Charaxes*, *C. polyxena* appears to be the representative here, it is found in the wooded localities. Of the Sub-Fam. *Nemeobiinae* I have taken *Abisara echerius*, which appears to be out even on the coldest days, and seems to be a sluggish little butterfly, which flits about close to the ground, settling every few yards.

Among the *Lycaenids* there are some I have not yet been able to identify, but the following are the species I have named so far: *Curetis dentata*; *Zizera maha*, found commonly in grassy places, flitting close to the ground; *Jamides bochus*, uncommon; *Lehera eryx*, uncommon; *Spindasis lohita*, and *Chilades laius*, fond of grassy places and waste ground. This brings my list of *Lycaenidas* to an end, owing to lack of means to identify species; but I have several species in my collection I took at Hong Kong I have not yet been able to identify.

Hong Kong appears to be very rich in *Hesperiids*. Among the species I took there is *Parnara guttatus*, the others I have not yet had time to identify. Taking into consideration the fact that being in a ship at Hong Kong for only short intervals, and therefore not

having such good opportunities for collecting in one given spot as if one were stationed ashore, it would seem from these short notes, that considering its small size, the Island of Hong Kong must be extraordinarily prolific in its lepidopterous fauna.

Lepidoptera in Peninsular Italy during the year 1920.

By O. QUERCI.

(Continued from page 29.)

On August 1st, 1920, my son-in-law, Dr. Enzo Romei left for the Monti Sibillini to complete the researches begun by my wife and daughter in 1912 and continued in 1913, in 1918 and in 1919. The Monti Sibillini afford a lepidopterological fauna very rich and varied, but every species is localized and to collect many species it is necessary to walk long distances by difficult and fatiguing paths and often, on account of the long distances, to sleep on open mountains. My wife and daughter, though active and indefatigable walkers, often found themselves confronted by difficulties which they could not surmount. Dr. Romei, a young and energetic army officer accustomed to the hard life of the Alps during the war and inspired by great love of lepidopterology, was certainly in excellent condition to reach the furthest and most difficult localities and to complete the entomological study of the Sibillini.

As in the whole of peninsular Italy so also in the Sibillini mountains the emergence of lepidoptera takes place in two periods sharply divided by the summer pause, which corresponds with the time of greatest heat and drought. In normal years the first period lasts from June 15th to July 20th, and in this period there emerge:—*Syntomis phegea*, L., race *pfluemeri*, Wacq. *S. marjana*, Stauder, race *quercii*, Vrtý. *Procris statice*, L., race not identified. *P. globulariae*, Hb., race *notata*, Z. *P. cognata*, Ramb., race not identified. *P. tenuicornis*, Z., race not identified. *P. geryon*, Hb., race not identified. *Zygæna rubicundus*, Hb., race *rubicundus*. *Z. purpuralis*, Brunn., race *fiorii*, Costantini. *Z. scabiosae*, Schev., race *orion*, Calb. *Z. achilleae*, Esp., race *aestivalis*, Obth. *Z. loniceræ*, Schev., race *vivax*, Vrtý. *Z. stoichadis*, Bkh., race *montivaga*, Vrtý. *Z. transalpina*, Esp., race *altitudinaria*, Trti. *Z. oxytropis*, B., race *sibyllina*, Vrtý. *Z. carniolica*, Scop., race *incerta*, Rocci. *Nisoniades tages*, L., race *clarus*, Carad., I. gen. *tages*. *Erynnis laratheræ*, Esp., race *australior*, Vrtý. *E. baetica*, Ramb., race *rostagnoi*, Vrtý. *Hesperia serratulæ*, Ramb., race *serratulæ*. *H. malvoides*, Elw. and Edw., race *pseudomalvæ*, Vrtý., I. gen. *pseudomalvæ*. *Powellia sao*, Hb., race *gracilis*, Vrtý., I. gen. *sao*. *Augiades sylvanus*, Esp., race *sylvanus* (only one generation in the Sibillini). *Chrysophanus hippothoë*, L., race *italica*, Calb. *Rumicia phlaeas*, L., race *cleus*, F., II. gen. *initia-caudata*, Tutt, and *cleus*, F. *Loweia alciphron*, Rott., race *romanorum*, Fruhst. *Glaucopsyche cyllarus*, Rott., race *pauper*, Vrtý. *Scolitantides baton*, Bgstr., race *baton* (only one generation in the Sibillini). *Agriades thetis*, Rott., race *apenninigena*, Vrtý., I. gen. *apenninigena*. *A. thersites* (Cant.), Chapman, race *meridiana*, Vrtý., I. gen. *hibernata*, Vrtý. *Polyommatus icarus*, Rott., race *zelleri*, Vrtý., I. gen. *zelleri*. *Celastrina semiargus*, Rott., race *porrecta*, Vrtý. *Hirsutina damon*, Schiff., race *ausonia*, Vrtý. *Bithys quercus*, L., race *interjecta*, Vrtý. *Klugia spini*, Schiff.,

race *minuta*, Vrtý. *Libythea celtis*, L., race *celtis*. *Leptosia sinapis*, L., race *bivittata*, I. gen. *lathyri*, Hb. *Pieris rapae*, L., race *rapae*, I. gen. *metra*, Steph. *P. napi*, L., race *vulgaris*, Vrtý., I. gen. *napi*. *P. brassicae*, L., race *lepidii*, Rüb., II. gen. *lepidii*. *Aporia crataegi*, L., race *minor*, Vrtý. *Parnassius mnemosyne*, L., race *frühstorferi*, Trti. *Coenonympha tiphon*, Rott., race *italica*, Vrtý. *C. pamphilus*, L., race *emianstralis*, Vrtý., I. gen. *emianstralis*. *Erebia ceto*, Hb., race *obscura*, Rätz. *E. stygna*, O., race *rühli*, Fruhst. (= *valesiaca*, Elw.). *E. gorge*, Esp., race *carboncina*, Vrtý. *Melanargia galathea*, L., race *monticola*, Vrtý. *M. japygia*, Cyr., race *medioitalica*, Vrtý. *Pararge megera*, L., race *megera*, I. gen. *megera*. *P. maera*, L., race *apennina*, Vrtý., I. gen. *apennina*. *Satyrus cordula*, F., race *calabra*, Costa (= *acteina*, Obthr.). *Hipparchia semele*, L., race *teres*, Fruhst. *Melitaea athalia*, Rott., race *tenicola*, Vrtý. *M. varia*, Meyer-Dür, race *varissima*, Vrtý. *Argynnis aglaia*, L., race *apenninica*, Vrtý. *A. niobe*, L., race *apenninica*, Vrtý. *Pyrameis cardui*, L., race *carduelis*, Cr.

We have never found the I. gen. of *R. phlaeas* and *P. brassicae* which perhaps emerge very early in the season.

In the second period, from August 3rd to September 20th, emerge: *Z. stoichadis*, Bkh., race *montivaga*, Vrtý. (the individuals whose development was delayed by the summer pause). *Z. transalpina*, Esp., race *altitudinaria*, Trti. (same as before). *N. tages*, L., race *clarus*, Carad., II. gen. *clarus*. *H. carthami*, Hb., race *carthami*. *H. alveus*, Hb., race *centralitaliae*, Vrtý. *H. foulquieri*, Obthr., race *picena*, Vrtý. *H. onopordi*, Ramb., race *fulvotincta*, Vrtý., II. gen. *fulvotincta* (the I. gen. has never been found in the Sibillini). *H. armoricanus*, Obthr., race *fulvoinpersa*, Vrtý., II. gen. *fulvoinpersa* (same as before). *H. malvoides*, Elw. and Edw., race *pseudomalvae*, Vrtý., II. gen. *malvoides*. *P. sao*, Hb., race *gracilis*, Vrtý., II. gen. *gracilis*. *A. flava*, Brunn. (= *thauwas*, Hufn.), race *iberica*, Tutt. *A. acteon*, Rott., race *acteon*. *Urbicula comma*, L., race *alpina* Bath. *H. virgaureae*, L., race *apennina*, Calb. *R. phlaeas*, L., race *eleus*, F., III. gen. *eleus*. *A. coridon*, Poda, race *sibyllina*, Vrtý. *A. thetis*, Rott., race *apenninigena*, Vrtý., II. gen. *apenninigena*. *A. thersites* (Cant.), Chapman, race *meridiana*, Vrtý., II. gen. *meridiana*. *P. icarus*, Rott., race *zelleri*, Vrtý., II. gen. *aestivalis*, Tutt. *P. meleager*, Esp., race *squalida*, Vrtý. *P. tithonus*, Hb. (= *eros*, O.), race *italica*, Obthr. *H. damon*, Schiff., race *ausonia*, Vrtý. (the specimens whose development was delayed by the summer pause). *H. dolus*, Hb., race *virgilia*, Obthr. *A. medon*, Hufn., race *agastis*, W.V., II. gen. *aestiva*, Stgr. (we have never found the I. gen.). *P. argus*, L. (= *aegon*, Schiff.), race *apenninica*, Vrtý. *Nordmannia ilicis*, Esp., race *inornata*, Vrtý. *Colias croceus*, Fourc. (= *edusa*, F.), race *croceus*, III. gen. *croceus* (the I. and II. gen. have not been found in the Sibillini). *L. sinapis*, L., race *bivittata*, Vrtý., II. gen. *bivittata*. *P. napi*, L., race *vulgaris*, Vrtý., II. gen. *napaeae*, Esp. (the III. gen. seems to be wanting in the Sibillini). *P. rapae*, L., race *rapae*, L., III. gen. *autumnalis*, Stauder (= *tertia*, Vrtý.); (the II. gen. emerges in very few individuals during the summer pause). *P. brassicae*, L., race *lepidii*, Rüb., III. gen. *autumnalis*, Stauder (= *tertia*, Vrtý.). *P. apollo*, L., race *euapenninus*, Vrtý. *C. pamphilus*, L., race *emianstralis*, Vrtý., II. gen. *aestivalis*, Rocci. *Hyponomephele lycaon*, Rott., race *analampra*, Trti. *Erebia jurtina*, L., race *janira*, L. *E. neoridas*, B., race *sibyllina*, Vrtý. *E.*

ligea, L., race *siscia*, Fruhst. *E. tyndarus*, Esp., race *majellana*, Fruhst. (= *infrangentea*, Vrtý.). *P. megera*, L., race *megera*, II. gen. *filippluma*, Ball. *S. fagi*, Scop. (= *hermione*, auct.), race *major*, Esp. *H. briseis*, L., race *interjecta*, Vrtý. *L. rivularis*, Scop. (= *camilla*, auct.), race *rivularis*, III. gen. *prodiga*, Fruhst. (the other gen. seem to be wanting in the Sibillini). *Melitaea didyma*, Esp. (only one individual was found in August, 1919). *A. cydippe*, L., race *clarens*, Vrtý. *Dryas paphia*, L., race *magnata*, Vrtý. *Polygonia c-album*, L., race *c-album*.

Dr. Romei immediately began his researches on the summits of the mountain mass of the Sibillini, specially looking for *P. apollo*, *E. ligea* and *E. tyndarus*, but he found absolutely nothing. Pursuing his researches in the less elevated localities he collected from August 2nd to 13th a few specimens of *H. foulquieri*, *A. comma*, *H. virgaureae*, *A. thetis*, *P. icarus*, *P. hylas*, *Z. transalpina*, and a great number of *A. coridon* and *E. neoridas*. All the other species of the second period were absent notwithstanding that the epoch was just that of their emergence.

My son-in-law had collected with us on the Monte Sumbra many *A. coridon* in July, and now he found the same species which emerged later on account of the greater elevation of the mountain mass. The conditions of capture were also changed: on the Sumbra the *A. coridon* could take refuge in the evening on the stems of grass and their capture was much easier; on the Sibillini instead all the grass had been destroyed by the prolonged drought. An infinite number of *A. coridon* flew near the ground without finding convenient resting places. In order to capture them with greater ease Dr. Romei diverted a stream of water and inundated a zone of ground, the thirsty *A. coridon* hurried to it and could be captured in masses by beating the ground with the foot, making them fly and taking them on the wing. In this way he was able to bring back about two thousand very perfect specimens, amongst which were some notable specimens of the form *cinnus*, Hb., and *corydonis*, Bgstr.

Towards August 20th all emergence of insects ceased, and on September 1st my son-in-law returned to Florence and we went together to see if by the effect of the rains the "pause" had finished at the Pian di Mugnone. The ground had greened over, many flowers had come out, and the absence of Lepidoptera was not so marked as in the preceding months of June, July and August.

From September 5th to 20th there was a great emergence of the species which in normal years appear in August. At first Dr. Romei and I, and afterwards also my wife and daughter, who had escaped from the earthquake of the Garfagnana, collected assiduously, and I give here the list and the comparison with the preceding years:—

N. tages, L., race *clarus*, Carad. II. gen. *clarus*.—Only one pair: male and female.

E. altheae, Hb., race *australiformis*, Vrtý., II. gen. *australiformis*.—Absent.

E. alceae, Esp., race *australis*, Z., II. gen. *australis*.—Only one male.

H. onopordi, Ramb., race *fulvotincta*, Vrtý., II. gen. *fulvotincta*.—Several individuals, but the underside is not so fulvous as in the specimens of the Camaione valley.

H. armoricanus, Obth., race *fulvoinspersa*, Vrtý., II. gen. *fulvoinspersa*.—Same as before.

H. malvoides, Elw. and Edw., race *pseudomalvae*, Vrtý., II. gen. *malvoides*.—Absent.

P. sao, Hb., race *gracilis*, Vrtý., II. gen. *gracilis*.—Only one male.

U. comma, L., race *apennina*, Rostagno.—Absent.

A. sylvanus, Esp., race *sylvanus*, II. gen. *minuta*, Vrtý.—Only one pair.

R. phlaeas, L., race *nigrioreleus*, Vrtý., III. gen. *nigrioreleus*.—Very few individuals.

Lowia dorilis, Hufn., race *italorum*, Vrtý., II. gen. *italorum*.—Only one female.

S. baton, Bgstr., race *baton*, II. gen. *baton*.—Absent.

A. aragonensis (Gerh.) Vrtý., race *florentina*, Vrtý., II. gen. *altera*, Vrtý.—Abundant.

A. thetis, Rott., race *etrusca*, Vrtý., II. gen. *etrusca*.—Scarce, while in August, 1917, it was very abundant.

A. thersites (Cant.) Chapman, race *meridiana*, Vrtý., II. gen. *meridiana*, Vrtý.—Abundant. Several specimens are very small.

P. icarus, Rott., race *zelleri*, Vrtý., II. gen. *aestivalis*, Tutt.—We collected more than 2000 specimens, but we did not find any aberration.

Aricia medon, Hufn., race *pallidefulva*, Vrtý., II. gen. *pallidefulva*.—Emerges in greater numbers than in the preceding years.

Everes alcetas, Hb., race *alcetas*, II. gen. *alcetas*.—One pair only.

Celastrina argiolus, L., race *calidogenita*, Vrtý., III. gen. *canicularis*, Vrtý.—One female only.

Raywardia telicanus, Lang., race *telicanus*.—Frequent.

Lampides boeticus, L., race *boeticus*.—One pair only.

Gonepteryx cleopatra, L., race *europaeus*, Vrtý., III. gen. *tertia*, Vrtý.—Absent.

G. rhamni, L., race *transiens*, Vrtý., III. gen. *tertia*, Vrtý.—Absent.

C. croceus, Fourc., race *croceus*, III. gen. *croceus*.—A few specimens.

C. hyale, L., race *calida*, Vrtý., III. gen. *calida*.—Absent, whilst in the preceding years it was very abundant.

L. sinapis, L., race *bivittata*, Vrtý., III. gen. *bivittata*.—Absent.

Pontia daplidice, L., race *daplidice*, III. gen. *daplidice*.—A few specimens.

Pieris napi, L., race *vulgaris*, Vrtý., III. gen. *napaeae*, Esp.—Very scarce.

P. manni (Mayer), Trti., race *rossii*, Stef., III. gen. *tertia*, Vrtý.—Absent.

P. brassicae, L., race *catolencae*, Rüb., III. gen. *autumnalis*, Stauder (= *tertia*, Vrtý.).—Absent, whilst in the preceding years it was abundant.

Papilio machaon, L., race *emisphirus*, Vrtý., III. gen. *aestivus*, Z.—Absent.

C. pamphilus, L., race *australis*, Vrtý., II. gen. *emilyllus*, Vrtý.—Two specimens.

C. arcanus, L., race *tenuelimbo*, Vrtý., II. gen. *gracilis*, Vrtý.—Absent, whilst in the valley of the Camaione it has been very abundant this year.

P. megera, L., race *megera*, III. gen. *filipluma*, Ball.—Only one specimen.

S. statilius, Hufn., race *intermedia*, Vrtý.—One male only.

S. fagi, Scop., race *major*, Esp.—A few specimens.

H. semele, L., race *teres*, Fruhst.—One male.

H. briseis, L., race *deminuta*, Fruhst.—One male.

L. rivularis, Scop., race *rivularis*, III. gen. *prodiga*, Fruhst.—A few specimens.

M. phoebe, Knoch., race *pauper*, Vrtý., II. gen. *pauper*.—Absent, whilst in 1917 it had been very abundant.

M. didyma, Esp., race *protea*, Vrtý., II. gen. *caldaria*, Vrtý.—Frequent.

Brenthis dia, L., race *laetior*, Vrtý., III. gen. *flavens*, Vrtý.—Frequent.

D. paphia, L., race *magnifica*, Vrtý.—Absent.

It is to be noted that in this second period of emergence in the neighbourhood of Florence there was a delay of a month in the renewal of the development of Lepidoptera compared with the normal epoch, as well as an absence of the commonest and most diffused species. Only *P. icarus* and *A. thersites* emerged in greater number than in the preceding years.

In the first fifteen days of October there was a period of rains, but on the 14th, 15th, and 16th the fine weather returned and we collected :—

H. armoricanus, L., race *fulvoinspersa*, Vrtý., II. gen. *fulvoinspersa*.—A few specimens.

R. phlaeas, L., race *nigrioreleus*, Vrtý., IV. extraord. gen. *initia-caudata*, Tutt.—Several specimens.

A. thersites (Cant.) Chapman, race *meridiana*, Vrtý.—Extremely small "tardy" individuals of the second gen. *meridiana*, Vrtý.

A. thetis, Rott., race *etrusca*, Vrtý.—"Precocious" autumnal individuals of the I. gen. *maja*, Vrtý.

P. icarus, Rott., race *zelleri*, Vrtý., II. gen. *aestivalis*, Tutt.—Small individuals.

C. hyale, L., race *calida*, Vrtý.—"Precocious" autumnal individuals of the I. gen. *vernalis*, Vrtý.

O. croceus, Fourcr., race *croceus*.—"Precocious" autumnal individuals of the I. gen. *vernalis*, Vrtý.

P. manni (Mayer) Trti., race *rossii*, Stef.—"Precocious" autumnal individuals of the I. gen. *farpa*, Fruhst.

The weather was once more fine from November 11th to 15th, but no Lepidoptera in perfect condition were found in the country, now covered with dried leaves fallen from the trees. Our collecting for 1920 was at an end.

I have collected Lepidoptera for many years in Italy, but I do not remember another year so adverse to the development of insects. Not only Lepidoptera were scarce, but also ants, dragon-flies and Coleoptera. The crickets were not so abundant as usual. Only the Diptera appeared in considerable quantity, and we collected many species in Florence, in Calabria, in Garfagnana, and especially in the Valley of Camaione. The Diptera were wanting on the Sibillini mountains, so that Dr. Romei only brought back about 40 specimens, chiefly *Tabanidae*.

A similar season occurred in 1890, and I remember that in the month of June I made long excursions in the Roman Campagna and in the Alban hills near Rome without seeing an insect except swarms of crickets. In 1909 we collected every day in the Aurunci mountains

(Naples); in the month of June of that year we took less than 100 *Rhopalocera* and in July none at all, while in June, 1911, we caught on the same Aurunci mountains more than 5,000 *Rhopalocera*.

In the months of May and June, 1918, both in Florence and in the Mainarde mountains (Neapolitan Apennines) the *Rhopalocera* were scarce, but in compensation the *Zygænae* were abundant, whilst this year also they were wanting.

A sudden cessation of development in the analogous species in which it happened this year in Florence, Calabria, and in Garfagnana, happened to my wife and daughter in Sicily in June, 1918, and another in the Mainarde mountains on June 17th, 1919. My family then left the Mainarde hoping to find better sport in higher mountains and covered great distances on the Maiella (Molise) and on the Gran Sasso d'Italia (Abruzzi) without finding a trace of *Lepidoptera*; on the other hand, in the August of the same year, they were able to make abundant collections in the Sibillini, whilst this year also this locality gave negative results.

The collections of this year have not furnished any data for exact determination of the number of broods of *Rhopalocera*, because many species, whilst generally emerging several times in the year, have only had one single period of development, and some have not appeared at all. Thus the question of the number of broods of *G. cleopatra*, to which Mr. J. A. Simes alludes in the number for November, 1920, of the *Ent. Rec.*, has remained unsolved. I think that Dr. Verity is right in attributing three broods to this species, at least in Tuscany, which is without doubt the region of Italy most favourable for the development of *Lepidoptera*. I consider that Mr. Simes has been led into error by the phenomenon of the suppression of emergence which is so frequent in the high mountains, in the hills of Southern Italy, and along the shores of the Mediterranean.

I take this occasion to declare that Mr. Simes is perfectly right when he asserts (*Ent. Rec.*, 1920, p. 191), that the number of females of *M. arge* is about one-fifth of that of the males. Dr. Verity has not personally collected this species, and he was led into error by the notes which I furnished on my collecting of *M. arge* made at Formia (Naples) in 1910 and 1911. In those two years the number of females was actually greater than that of males, but the season must have contributed to produce this abnormal fact. From May 10th to 20th in the years above mentioned, whilst the males of *M. arge* were emerging, rain fell without interruption and the males could not develop their wings. From May 21st to 30th the weather was excellent and the females were all able to reach development. That this happened is shown by the fact that in 1919, in which the weather in the month of May was always fine, the number of males was at least five times that of the females, and the same proportion occurred this year in Calabria where the *M. arge* offers the beautiful race *turatii*, Rostagno (= *cucuzzana*, Stauder), and is considerably more scarce than at Formia and Brindisi.

COLEOPTERA.

RECORDS OF COCCINELLA 11-PUNCTATA, L.—With reference to Mr. Long's note on records of this Coccinellid on p. 34 of the present

volume, he would appear to have overlooked my notes on *Coccinellidae* (vol. xxxi., p. 213), where I have already recorded two specimens of ab. *tamaricis*, Ws., taken in August, 1919, in this district. I have since taken another specimen at Ashted Manor (March, 1920) and my brother, Mr. S. C. Leman, also took one at Southsea (April, 1920). I have also in my collection a hybrid specimen taken here in 1919 showing typical spots on right elytron and those of ab. *tamaricis*, Ws., on left elytron and which for purposes of distinction in my collection I call by the MS. name of *sinistro-tamaricis*.

Hybrids in this Coccinellid seem not uncommon as I have other specimens in my collection, which on the analogy of the above MS. name I distinguish as : *dextro-confluens*, *sinistro-confluens*, Haw., *dextro-cakiles*, *sinistro-cakiles*, Ws., *dextro-tripunctata*, L., *trinisesqui-dextro-punctata*, mhi., *sinistro-salsolœ*, Ws., and *sinistro-9-punctata*, L.

I have not taken however ab. *salsolœ*, Ws., yet.—G. B. C. LEMAN, 152, West Hill, Putney, S.W. 15.

ADDENDUM AND A CORRECTION.—In my note on "A New Locality for *Dryophilus anobioides*, Chev., and some other Coleoptera from Freckenham and Barton Mills, *Ent. Rec.*, 32 152 (1920) when giving the British localities for the *Dryophilus* I omitted to mention its capture in June, 1914, by Messrs. Morley and Elliott at Palmer's Heath near Brandon. In the same paper when recording the species taken on broom I wrote "*Bruchus loti*, Pk.," when I intended to have written *Bruchus ater*, Marsh.; and "*Apion rufirostre*, F.," instead of writing *Apion fuscirostre*, F.—HORACE DONISTHORPE.

SCIENTIFIC NOTES AND OBSERVATIONS.

BROODS AND DIFFERENTIATION OF *GONEPTERYX CLEOPATRA* AND *G. RHAMNI*.—Being now in Zurich I am naturally reading up Swiss entomology, noting chiefly what Frey says about those species of Lepidoptera which one may hope to meet with in early spring. I find he was of the opinion that *Gonepteryx rhamni* has two broods, one in June-July and a second from August onwards which hibernates. Frey also doubted if *G. cleopatra* was really a separate species. (Frey, *Lepidopteren der Schweiz*, p. 9, 1880.)

This latter point causes me to pen these few lines. On one of those delightful and instructive Sunday evenings that we used to spend at the late Mr. Tutt's house, the question arose as to what difference there might be between the ♀ of *G. cleopatra* and that of *rhamni*. Tutt got out his series of both and on looking at the undersides I noticed that the costa of the hindwing was convex in *cleopatra* and nearly straight in *rhamni*. In order to test this feature Tutt made me stand with my back to the cabinet drawers containing the series so that I could not see the data and then brought me specimens to name, this I was able to do correctly by observing the shape of the hindwing only. As far as I remember no note was made of this at the time.—ALFRED SICH, Zurich, March 7th, 1921.

NOMENCLATURE.—*POLYOMMATUS ICARUS* [see ante, p. 54].—All the above difficulties are easily explained:—

The "presumption" is incorrect, Bienert definitely calls *persica* an "aberration."

(a) The authority is his own description of the insect in question.

(b) Nothing is, as a rule, more futile than to puzzle as to the "why and wherefore" of nomenclature; it is frequently meaningless, and when it has a meaning is sometimes quite misleading; in this case, however, Bienert obviously called it *persica* because he took it in Persia, a fact which would certainly not preclude its occurrence elsewhere, which it would be almost certain to do even if it were (which it is not) the dominant form in Persia.

(c) Because *fugitiva* is the first name which was ever applied to the Persian race; its appropriateness or otherwise cannot be taken into consideration.

(d) *Obsoleta* refers to the spots, not to the insect.

(e) Of course aberrations of the English race, corresponding with an aberration of the *fugitiva* race, which happened to be the first example named.—G. WHEELER.

NOTES ON COLLECTING, Etc.

GYNANDROMORPH OF PYRAMEIS ATALANTA.—Mr. C. Greenwood of Bristol has been good enough to send me for inspection, an example of this butterfly bred by himself last season that has every appearance of being a gynandromorph. The wings on the left side are much smaller than those on the right, the difference in size being most marked; there is no sign of deformity, all the wings being perfectly formed. The markings on the underside do not quite agree, and the body appears to be of female form. I am of opinion that this is a true hermaphrodite, but owing to the similarity of marking in both sexes only an examination by such an expert as Dr. Cockayne could definitely decide the point.

In the list of gynandromorphic butterflies published by Mr. H. J. Turner in the *Ent. Record*, vol. xxvii., p. 58, one example of *Pyrameis atalanta*, apparently of continental origin, is included, and this is the only record I know of. No doubt, gynandros of the *Vanessidae* would escape observation owing to the similarity of both sexes; this I assume accounts for the paucity of records.—S. G. CASTLE-RUSSELL, Andover, Hants.

A NEW RECORD FOR *ERIOSOMA LANGERUM*.—On November 5th of last year I found a shrub (*Cotoneaster* sp.?) in my garden at Putney was infested with a large number of the "woolly apple aphid" (*Eriosoma langerum*). Mr. Laing, who kindly identified this aphid for me, tells me that the species has not previously been recorded as being found on this shrub.—H. DONISTHORPE, Putney, March, 1921.

CURRENT NOTES AND SHORT NOTICES.

Our colleague, the Rev. Geo. Wheeler, M.A., has unfortunately met with an accident in the street which, although not apparently serious at first, seems to have considerably upset his nervous system, so that he feels himself with much regret compelled to give up the now very onerous duties of Honorary Secretary of the Entomological Society, London. Mr. H. Rowland-Brown, M.A., has succeeded him

as Secretary. We may note, in this connection, that all communications for the Society should be addressed to 41, Queen's Gate, South Kensington, S.W. 7.

The Report of the Council of the Ray Society is to hand. The President is Professor W. C. McIntosh, M.D., L.L.D., D.Sc., etc. There is an increase of membership for the year 1920, but to adequately carry on the activities of the Society will need a considerably greater increase in subscriptions and income in the near future. The Rt. Hon. Lord Rothschild, F.R.S., was elected a Vice-President, and Mr. E. E. Green, F.E.S., a member of Council. The Hon. Secretary is Dr. W. T. Calman, D.Sc., F.L.S., F.Z.S., 1, Mount Park Crescent, Ealing, London, W. 5.

The Publishers of the Genera Insectorum announce the issue of the fascicule on the *Tabanidae* (Dip.).

We are pleased to announce that the Fellows of the Entomological Society, London, can now obtain books and separata on loan as usual. Although much still remains to be done in the re-arrangement and equipment of the Library, it is possible for the sub-librarian now to find most of the items which have been applied for during the past few months. Of course Fellows understand that the postage both ways is paid by the borrower.

SOCIETIES.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

October 6th, 1920.—ELECTION OF FELLOWS.—Messrs. A. M. Altson, 26, Addison Mansions, Blythe Road, West Kensington; Hubert Meredydd Morris, M.Sc., Institute of Plant Pathology, Rothamsted Experimental Station, Harpenden; Sydney Douglas-Crompton, Villa Helvetia, Costebelle, Hyères, France; J. C. M. Gardner, Entomological Dept., Royal College of Science, S.W. 7; Bernard Sinclair Goodban, Braemar, Belvedere Road, Upper Norwood, S.E. 19; Harry Hargreaves, Entomological Dept., Royal College of Science, S.W. 7; Charles McFarlane Inglis, M.B.O.U., F.Z.S., Baghownie Factory, Laheria Sarai, Bihar, India; Douglas Johnstone, Brooklands, Rayleigh, Essex; Capt. Arthur Leslie Kent-Lemon, York and Lancaster Regt., c/o Postmaster, Khartoum, Sudan, and Blytheswood, Ascot, Berks; Messrs. W. H. J. Prior, Culham, Main Road, New Eltham, Kent; Philip Bernard Richards, Agricultural Dept., Kuala Lumpur, Federated Malay States, and 52, Longridge Road, Earl's Court, S.W. 5; Lieut. J. Seabrook, 8, Warwick Place, S.W. 1; and Mr. John William Spencer, 5, Dogford Road, Rayton, Oldham, Lancs., were elected Fellows of the Society.

THE SOCIETY'S NEW QUARTERS.—The Treasurer gave an account of the negotiations for new quarters for the Society, saying that No. 41, Queen's Gate was now almost certainly secured, the cost of the Freehold, re-decorating and furnishing would be about £9,000, towards which a considerable sum in donations and loans had already been promised. He urged upon the Fellows the duty of supporting the project.

EXHIBITS.—ORNITHOPTERA RUBIANUS.—Mr. A. Dicksee exhibited five males of *O. rubianus* from Ranonga, the westernmost of the Solomon Islands, two specimens only being previously known. He pointed out

that no two specimens were alike; they were taken in January and February.

MERMITHOGYNES OF ACANTHOMYOPS NIGER, AND AN EARWIG WITH RUDIMENTARY FORCEPS.—Mr. Donisthorpe exhibited a number of mermithogynes of *Acanthomyops* (*Donisthorpea*) *niger*, L., taken in a populous nest of this ant situated under a large flat stone near a small stream running into the sea at Mother Ivy's Bay, W. Cornwall, on July 7th, 1920. Also a number of the worms extracted from the gasters of the ants. One or two worms occurred in each ant. Mr. Donisthorpe further exhibited a live specimen of the common Earwig (*Forficula auricularia*) taken near Wellington College on September 13th last, the forceps of which were practically absent, being represented by the merest rudiments.

HETEROCERA AND DIPTERA CHIEFLY FROM N. ITALY.—Lieut. Ashby exhibited a number of moths taken during the summers of 1918 and 1919 in the districts of Vicenza, Arquata Scrivia, and Turin; also a few from France, including *Lignicolor furrata* from St. Martin Vesubie, and from La Granja, Spain. He also exhibited a large number of Diptera from the above Italian localities.

PAPER.—“The full-grown Larva of *Lycaena euphemus*, Hb.,” by T. A. Chapman, M.D., F.R.S., etc.

October 20th.—ELECTION OF FELLOWS.—Dr. F. G. Rambousek, Prague, Czeckoslovakia; Messrs. William F. Schlupp, B.Sc., The School of Agriculture and Experiment Station, Potchefstroom, Transvaal; George Harold Skaife, M.A., Agricultural College, Cedara, Natal, S. Africa; and Robert Owen Wahl, B.A., Groot-fontein School of Agriculture, Middleburg, Cape Province, S. Africa, were elected Fellows of the Society.

THE NEW HOUSE.—The Chairman, as Treasurer, made a further statement as to the new house and mentioned that the cost of the freehold was £6,250.

EXHIBITIONS.—ABERRATION OF BRENTIS SELENE.—Mr. E. E. Green exhibited an interesting aberration of *B. selene*, taken at Camberley on June 24th last. The aberrant characters are more conspicuous on the underside of the wings. The spot at the base of the forewing is missing, and the markings of the outer border are diffused. On the hindwing the ground-colour is silvery white, with a faint greenish tinge, while the usual red markings are largely replaced by a suffusion of black scaling. The upper surface has the black pattern on the hindwing diffused, with the spots more or less confluent, those of the median series being united to form a continuous transverse band.

BUTTERFLIES (DELIAS: PIERINAE) MIGRATING IN EVENING FROM ONE VALLEY TO ANOTHER IN SELANGOR, F.M.S., AND BACK IN MORNING, ACCOMPANIED BY MOTH MIMICS (DYSPHANIA (EUSCHEMA) GEOMETRINAE) AND THESE AGAIN BY THEIR MOTH MIMICS (PSAPHIS: CHALCOSIINAE: ZYGÆNIDAE).—Prof. Poulton exhibited the following Lepidoptera from Bukit Kutu, in Selangor, close to the borders of Pahang, about 35 miles N.N.E. of Kuala Lumpur—a part of the collection made by Mr. A. R. Sanderson.

Delias nina, Wall.—3 ♂.

Delias pyramus, Wall.—2 ♂ 1 ♀.

Dysphania (*Euschema*) *glaucescens*, Walk. (*regalis*, Butl.).—1 ♂ 2 ♀.

Dysphania (*Euschema*) *militaris*, L., f. *selangora*, Swinh.—1 ♂.

Psaphis (*Canerkes*) *camadeva*, Dbl. (*semitplena*, Walk.; *resumpter*, Walk.).—1 ♂.

There could be no doubt that, as Mr. Sanderson states, all the species would resemble each other upon the wing; for the deep red of the *Delias* would then be the least conspicuous element in its pattern, while the general distribution of the black and blue-grey on all wings and yellow upon the hind, is similar in the Pierines and Geometers, the resemblance being heightened during flight by the likeness between the patterns of upper and under surface. In the male Chalcosiine mimic, however, the resemblance depends almost entirely upon the under surface where alone is developed the essential feature contributed by the yellow. The female *Psaphis camadeva*, with the yellow markings strongly developed on both surfaces, was very similar to *Canerkes scotais*, Jord., and the larger species, *C. euschmoides*, Moore, all three being close mimics of *Dysphanias*. *C. euschmoides*, from Assam and "India," resembled *D. excubitor*, Moore, and the Indian form of *D. militaris*, L.; *C. scotais*, Jord., from Borneo *D. subrepleta*, Walk.; the female of *P. camadeva* in Malacca, Borneo, and probably in Java *D. subrepleta*, and in the Philippine Islands the allied *D. plena*, Walk. The combination was typically Müllerian, *Psaphis* belonging to a specially protected Family and Subfamily, *Dysphania* acting as a model as well as a mimic, *Delias* being well-known as a model for other Pierines, for Elymniniines, Nymphalines and Chalcosiine moths other than *Psaphis*.

The insects passed over from a deep valley about 5.30 p.m. to 6.45 p.m., sometimes two or three together at intervals of about one to two minutes and occasionally appearing in a more or less continuous straggling line for ten to twenty minutes. Generally a maximum number passed over in approximately an easterly direction about 6 p.m. "The phenomenon was repeated in the opposite direction in the early mornings, 6.30—8 a.m., the numbers being approximately the same, so far as I could judge."

THE COLOUR OF THE LARVA OF *SMERINTHUS OCELLATUS*, ON WILD CRAB.—Prof. Poulton said that during the past September he had had the opportunity of confirming his early observation that the larva of *S. ocellatus*, when feeding on the crab, gains a shade of green entirely different from that produced by the ordinary cultivated apple. The latter, with their white undersided leaves produce larvæ of a bluish-green tint below, becoming very pale, almost dead white, but still very faintly tinged with bluish-green, above; while the crab leaves with green under surfaces produce bright yellowish-green larvæ with a pale yellowish dorsal surface. It was the recognition of the difference between *ocellatus* caterpillars on Siberian crab and other apple trees, in his father's garden at Reading nearly fifty years ago which had first directed his attention to the power of individual colour adjustment in larvæ, and, also inspired by the late Prof. Meldola's notes in Weisman's "Studies in the Theory of Descent," had led him to observe and experiment largely upon the species. (*Trans. Ent. Soc. Lond.*, 1884, p. 35; 1885, pp. 305-307; *Proc. Roy. Soc.*, Vol. xxxviii., 1885, pp. 298-306; Vol. xl., 1886, pp. 135-173.)

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Duplicates.—Aglaia, Adippe. *Io, T. quereus, Coridon vars., *Fuliginosa (Reading), *B. quereus ♀; Tiliæ, Menthastri, *Linariata, Aurantiaria, Leucophæaria vars. Paniscus. *Desiderata.*—Pupæ of Dictæoides; Imagines of typhon, palpina, camelina (dark), Curtula, Pyra, and numerous others; Ova of Hispidaria.—Harold B. Williams, 112a, Bensham Manor Road, Thornton Heath, Surrey.

CHANGE OF ADDRESS.—S. G. C. Russell, "Roedean," The Avenue, Andover Junction, Hunts.

Mr. Donisthorpe will still be glad to receive ants and Myrmecophiles from all parts of the British Isles, and to name any such for anyone who is kind enough to send them to him. He would however suggest that ants from any other parts of the world be sent to his colleague, Mr. W. C. Crawley, 29, Holland Park Road, W. 14. Mr. Crawley is specialising on the ants of the world, and it is a matter for congratulation that we should possess an Entomologist in this country whose whole attention should be concentrated on this branch of Entomology.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Princes Gate, South Kensington, S.W. 7, 8 p.m. May 4th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street, E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. (No Meetings in July or August.) Visitors welcomed. Hon. Sec., W. E. GLEGG, 44, Belfast Road, N. 16.

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An Essay on the Systematic Study of Variation in the Races of *Zygaena filipendulae*, L., and of its subspecies *stoechadis*, Brkh.

By ROGER VERITY, M.D.

The literature dealing with this species is chaotic to a point, which is equalled by few other instances. This is evidently due to the extent of individual variation in some of its southern races, to its geographical variations, and also to its resemblance in some regions to *Z. transalpina*. I have again quite lately received from well known and clever entomologists series in which the two species were mixed up together under one name, showing it needs practice to separate them, although to a trained eye the position of the spots on the fore-wing, which I have described dealing with *Z. transalpina* (*Ent. Rec.*, xxxii., p. 29), seems such an easy and sure differential character that no others are required. No wonder that ancient authors should have got so hopelessly mixed in this genus! Until the beginning of this century collections were made up of striking individual variations; those which had been named were eagerly sought for and one or two specimens were thought quite sufficient to represent them and to constitute a "complete collection"; intermediate specimens were generally discarded; labels were by many avoided, so as not to spoil the effect of the cabinet; when a record of localities was kept, such indications as "England," "Italy," "the Alps" were considered quite sufficient, and dealers carefully avoided revealing the source of their specimens. With such a material to work on it is easy to understand that a genus like *Zygaena*, in which individual differences are in some cases much more striking than specific ones, could not be unravelled. As late as 1899, and in an author such as Tutt, we still find the greatest uncertainty as to the limits of species and, to the present day, Staudinger, Seitz, Dziurzynski and others have maintained a number of them, which certainly do not exist, although the two latter writers have much reduced them, as compared with the first, in connection with the Eastern regions. Lack of material to work upon and of field observations is evident in their writings; races, individual forms and aberrations are treated on the same footing; localities are quoted without making any distinction between those where a form constitutes the majority of individuals and characterises the race and those where it only occurs as an extreme variation. M. Charles Oberthür was the man who really cast new light on the subject in his *Études de Lépidoptérologie Comparée*, vol. iv. (1910). He first of all collected an adequate material (18,000 specimens of *Zygaena*) and he then compared large series from all sorts of localities, effectively outlining a picture of their individual and geographical variations. By a critical study of original descriptions and figures he then endeavoured to disentangle the perplexities of the literature on this genus and to establish the names of the different races. The object of this paper is to summarise his conclusions and to try and carry his method a little further, suggesting one or two alterations in nomenclature in accordance with the rule of priority, and describing other races, which I have had an occasion to examine. I have been fortunate enough to be able to avail myself of the thorough "field experience" and knowledge acquired by Signor Orazio Querci in forty years' collecting on a large scale in Central Italy and of the fine series of specimens with which he

MAY 15TH, 1921.

has enriched my collection. Italy is certainly the richest country in *Zygæna* and a contribution of this sort has enlightened many obscure points and revealed unsuspected errors of the past.

The first remark I must make about the species we are here dealing with is, that it is quite surprising how hitherto *filipendulæ* and *stoechadis* should have been kept separated into two distinct species. There are for this absolutely no positive reasons, and indications to the contrary are instead numerous and conclusive. One seeks in vain for a character by which to constantly distinguish these two insects. All their different features suffer notable exceptions and combine mixedly in certain cases. As a rule the characteristics of *stoechadis* as compared with *filipendulæ* are, its larger size, more robust structure and tendency of the dark scaling of the wings to spread more extensively: thus, the body and antennæ are thicker, the wings broader and more rounded; the sixth red spot of forewing may be obliterated either above alone or on both surfaces, the hindwings constantly have a broader dark marginal band with its internal outline more waved, and this dark scaling can get so extensive as to cover the entire wing; finally, the red suffusion connecting the spots on the underside of the forewings has a much lesser extent and may often be entirely absent. Concerning the habitats of *filipendulæ* and *stoechadis* it must be noticed that they always exclude each other, the first ranging from the Arctic regions to the southern portion of Central Europe, the second replacing it entirely in Southern Europe. These two areas, however, are separated from each other by a broad belt of ground which extends from the Pyrenees to the south of France generally and to the basin of the Po (with its northern boundary on the watershed of the Alps and its southern one on that of the Apennines), and which thence stretches across the Balkan Peninsula to the Black Sea. In this belt we find both *filipendulæ* and *stoechadis*, and we find races which exhibit the mixture of characters mentioned above (these I will describe more at length when dealing with different races): (a) Pure *filipendulæ* are found in the Pyrenees and in the Alps at high altitudes, chiefly under the form of races *manni* and *paulula*; pure *stoechadis* is found in S.E. France (race *major*) and in Piedmont (races *medicaginis* and *stoechadis*). (b) A race of *filipendulæ* exhibiting characters transitional to *stoechadis* is known from the Bouches-du-Rhône (race *anceps*) and races of *stoechadis* exhibiting some *filipendulæ* characteristics are found in some Alpine localities. (c) A race in which pure *filipendulæ* and pure *stoechadis* occur commonly together as extreme variations and in which the majority of individuals constitute a gradual transition from one to the other, has been discovered in the Modenese Apennines. Finally I can add that the Sicilian race *siciliensis* of *stoechadis* resembles *filipendulæ* constantly to a degree, which might induce one at first sight to consider it one of its races, and it produces now and then individuals, amongst its weaklings, indistinguishable from the most robust and gaudy races of the latter. This need not surprise us, because also the race *trinacria*, Vrtý., of *Z. lonicerae*, Schv., and the Sicilian races of several *Ihopalocera* show a decided resemblance to those of Central Europe and are more similar to them than they are to the races of Central Italy, but this very fact seems a conclusive proof that *filipendulæ* and *stoechadis* are only two groups of races of one species

or, in other words, two sub-species, as compared with each other. I think the above evidences are more than enough to show that real transition exists between them. This brings me to speak of a phenomenon, which is more frequent in the genus *Zygaena* than in most other genera, and which constitutes one of the chief difficulties one meets in dealing with them. My experience in the matter has evidently been shared by two of the cleverest Lepidopterists, Tutt and Oberthür. I do not doubt that the rest have gone through it, but, as their writings consist in catalogues with short formal descriptions, they have carefully avoided acquainting us with their difficulties by not giving any explanation and justification of many doubtful general conclusions. Individual variation is, as a rule, very extensive in the *Zygaena*, and in some species and races particularly, it produces differences of aspect far greater than are several of the specific ones compared with each other; in nearly all the species, however, characteristic and individual variation follow most definite plans and are quite similar throughout the genus. The result of this is that several species resemble each other very much, races and individuals being produced which resemble kindred species more than they do the other more usual races and individuals of their own. When two species of this sort are found in the same locality and one sets to work to separate a series of specimens, part of them are easily grouped into two sets, but the remainder, to all appearance, constitute a continuous series of transitions from one to the other, in which no break is discernible. These apparent transitions were in the past explained in a wholesale fashion by the very convenient "hybrid theory," and entomologists, at this, set their minds at ease about them. With the increase of knowledge this theory has steadily been losing ground, and I think I can now safely state, that it only survives in the minds of those who are not sufficiently acquainted with this genus. No one has certainly ever collected as many *Zygaena* as Querci in his forty years' experience in Italy, and yet neither he nor I in tens of thousands of specimens examined have ever been able to detect one of these precious monsters, in spite of the fact that pairing between different species was several times observed in nature both by him and by myself. The counterpart of this negative evidence is to be found in the fact that specimens, identical with the most tempting ones collected, where two species occurred together, were also found as extreme variations in series collected in localities, where only one of the two existed. These examples have been chiefly afforded by *filipendulae* and *lonicerae*, which have proved treacherous even to the most experienced. In 1899 we still find Tutt utterly bewildered in his attempt to make out the *Zygaena* species. His chapter on the "Anthrocerid species" at the end of vol. I. of the *Brit. Lepid.* is most interesting and instructive, for it shows what difficulties one meets with when one tries to see one's way through "this unwieldy genus," as he puts it, even if one resorts, with the greatest accuracy, to a study of the early stages and of the structure of each insect. Tutt's brain-power was wonderful in the most minute systematic analysis and in patiently collecting and classifying every possible information upon a subject, but it evidently exhausted itself in this particular direction; he rarely drew enlightening conclusions from his long labour; that evidently is why he failed here,

when he strove to clear up the number of British species and their limits, although he probably was the first to investigate them in all their stages as thoroughly as he has done; the genus *Zygaena* affords an unlimited field for analysis, but synthesis is the hard nut to crack. His stumbling-blocks in the particular case of *filipendulae* and *loniceræ-trifolii* were the five-spotted form of the south in the former, in which he saw a transition to the latter, and the British insect which he called *hippocrepidis*, Stephens, and which Rebel rightly renamed *tutti*, because that name had been created by Hübner for quite another *Zygaena*. Tutt makes a separate species of it, mentions it in the description of *filipendulae* as a race (p. 509), places it at the end of this species, and then at p. 544 actually says "we have been unable, on the strength of our field observations, to come to any other conclusion than that *A. hippocrepidis* is a near ally, if not direct offshoot of *A. trifolii*." He was evidently in a very unsettled state of mind about it! The reasons he gives for his last conclusion are so excellent that I think they leave little doubt as to its correctness. They correspond to the fact repeatedly observed by Oberthür and others in N. France that *trifolii* and *palustris*, Obth., produce a six-spotted form. This is in no way surprising. The *Zygaena* nearly all vary so much and in so similar a manner that it would have been more surprising never to find six spots in such a near ally of *filipendulae* as the *loniceræ-trifolii* group. We now know that also *Z. angelicae*, O., produces quite commonly a six-spotted form, which hitherto would have been ascribed to *filipendulae*: it has been described by Burgeff in *Mitt. d. Münchener Ent. Ges.*, 1913, and named by him *rhatishbonensis* (l.c., 1914, p. 66.). I possess it from Regensburg and Bucharest. I can furthermore add that I have received a series of specimens evidently referable to the *Zygaena* from Bilbao, which Oberthür has called *seeboldi* (1910) and which probably is also partly *rubra*, Dziurzynski (1908), and that I am perfectly convinced it is not a race of *stoechadis*, as hitherto supposed, but a *loniceræ*, producing frequently a six-spotted form especially in the female sex. I have acquired this certainty not only from the look of these insects, but also from the fact that a year later, no less than one hundred specimens were reared from larvæ obtained from the same locality, if not exactly the same spot, as the series mentioned (Oviedo in the Asturias) and not one exhibited any trace of a sixth spot on either surface. I might also add that some of these individuals have quite the build and aspect of *trifolii*. It thus became quite obvious to me that *seeboldi* is a Spanish *loniceræ* and that it may produce a variable number of six-spotted individuals, according to localities and years, just as form *tutti* appears in numbers or entirely vanishes amongst the *trifolii* of the N. of France and England. I will deal with *seeboldi* more at length in a paper on *loniceræ* and also point out that there exists in Calabria a race quite intermediate between it and the race *virax*, Vrtý., of Central Italy; it has been called *silana* by Burgeff and *herthæ* by Stauder. Another race, which puzzled Oberthür considerably and which he calls "extremely enigmatic," is that of the Bouches-du-Rhône and the Var; he expressed it by calling it *anceps*; he states he felt very ill at ease about it because it consisted in a perfect mixture of *loniceræ*, *trifolii* and *filipendulae*, which could in no way be discerned from those of many other localities of distant Provence, and in a larger number of transitional individuals, so that

it could only be a compound of the three. This phenomenon seemed so wonderful that I very much wished to see it; I begged M. G. Foulquier to collect a large series of specimens for me in exactly the same locality as Oberthür's. When I got them I could for some time make nothing more than the latter of them, but as I made progress in puzzling out the difficulties in my Italian series, the truth dawned on me also concerning *anceps*. Another difficulty, which, as he recounts at length at pages 549 and 550, troubled Oberthür very much, was that of a series collected by himself and his brother at Caunterets: here 49 specimens were most typical *lonicerae*, 75 "could well be *filipendulae*," but 15 others could in no way be grouped either with the former or the latter, being perfectly transitional. This is exactly the experience which I went through in attempting to classify my Italian *Zygaena*. I had in several localities of Tuscany (Abetone, Piteglio, Covigliaio, Mount Senario) collected *stoechadis* and *lonicerae* together, the second beginning to emerge when the mass of the first was on the wing. I had invariably found a small number of specimens, which it seemed absurd to separate from the *lonicerae*, as they resembled it in every respect, but which exhibited on the other hand some slight trace (sometimes scarcely perceptible, but still unmistakably there) of a *stoechadis* characteristic, such as four or five red scales on the underside of the forewing in the place of the sixth spot. These extreme individuals were connected to *stoechadis* by a gradual series of intermediate forms, rapidly getting more numerous as they approached the more usual aspects of this insect. For some time I could not see how, with such facts before me, it was possible to deny that there existed two divergent series of forms, culminating in two species, but still not so sterile between each other as to hinder the production of offspring from cross-pairing. In short it seemed as if we had before our very eyes an example of the origin of species. That was more or less the conclusion reached by Oberthür and he had to admit it, notwithstanding the greatest reluctance and although, to use his words, "his spirit revolted at the idea."

Being a convinced evolutionist, I was far from having these scruples, but, still I quite saw that several points in that explanation were open to criticism. It was difficult to imagine, for instance, how two groups of individuals, which interbred so often as to constantly produce intermediate forms, could keep distinct. Querci too, on the strength of his field-experience, maintained that *lonicerae* and *filipendulae* must be two perfectly distinct species. We determined to clear up this mystery and during the last few years we collected large series of specimens in every possible locality. It was only a few weeks ago, however, that the explanation made itself clear, when I was struck by the fact that a few individuals of the most extreme variations of *stoechadis*, especially in the female sex, from localities where *lonicerae* never occurs, were so exactly similar to the latter that it was in some cases impossible to distinguish them from it, and in others it required consideration to do so. It then became obvious that forms apparently transitional to *lonicerae*, in localities where the two species fly together, are in reality only transitions to these extreme individual variations of *stoechadis*, which one would unhesitatingly have classified amongst the real *lonicerae* and which I have named in consequence *loniceraeformis* (Bull. Soc. Entom. Ital., xlvii., p. 74 (Dec.

16th, 1915). In Central Italy the line between the species must always be drawn amongst the individuals of this description, because race *vivax*, Vrtý., of *lonicerae* has particularly limited red spots and would never produce six-spotted individuals. In Spain the distinction may be expected to be more difficult, because it has to deal also with the six-spotted forms. To separate *loniceraeformis* from *lonicerae* is already anything but an easy task. Querci and I have searched in vain for a constant character to go upon; exceptions always occur. On the other hand, there are several tolerably good ones, and when two or three distinctly point in the same direction, one feels pretty sure of one's conclusion. In *loniceraeformis* the dark scaling is of a brighter indigo (less blackish) and more glossy; the red scaling is more warm and carmine, and when the specimen is held up against the light, this colour, in very fresh ones, does not turn as pink as do the more translucent spots of *lonicerae*; the dark marginal band of the hindwings has its internal limit more waved and less sharply defined because it tends to shade off in sparse scaling, especially towards the apex and between nervures C_1 and A_2 . The best distinctive characters are found, however, on the underside of the forewing: in form *loniceraeformis* the sixth spot is, of course, absent also on this surface, but very often a few red scales remain, which may escape notice at first; when they are detected on closer inspection they are conclusive; the presence of red scales along the hind cubital nervure of the cell may also be considered conclusive in specimens from Central Italy, because, where *vivax* is found alone, it never exhibits them, as do on the other hand, especially in the female, race *silana*, *seeboldi* and most others; finally the two basal spots are remarkably broader and longer, so that the distance between them and the median spots strikes one as much less than in *vivax*; in this case too the difference does not exist or is much reduced in other races of *lonicerae*, because in *vivax* the red scaling of the forewing is much more reduced generally than in any other race, evidently owing to its being the variation of *lonicerae*, which corresponds to the very dark *stoechadis* races of Central Italy.

On the ground of the differential characters just mentioned, Querci and I nearly always succeed, after a little mutual criticism, in separating specimens to the full satisfaction of both, but a few, out of hundreds examined every year, have actually baffled every attempt to reach a conclusion. These belong to a form which hitherto would have been placed amongst the *lonicerae* with the greatest confidence, together with many others which we now are sure belong to *stoechadis*. Far too great importance used to be given to the presence of six or five spots as specific characters distinguishing *jilipendulae* from the *lonicerae-trifolii*; only in the most obvious *stoechadis* was it conceded that five spots could be found. This has been the cause of so many hybrids and transitions having been thought to exist, when facts did not fit the false starting point. No one seems to have realised that if so many were met with by collectors, millions must have been produced, and that if they were not all sterile, it was absurd to maintain, as has been done, that *jilipendulae*, *stoechadis*, *lonicerae* and *trifolii* were four species. Burgeff states (*l.c.*, 1914, p. 61) that he obtained perfectly fertile offspring from a Bavarian male of *jilipendulae* and a female *stoechadis* from Genoa; why he calls them "hybrids,"

naming them *bavarica*, one does not quite understand; his experiment is the very proof that those insects belonged to one only species. I think we can now come to a conclusion which will clear up many of the mysteries of the past and which will even satisfy Oberthür's creationist's convictions: *different species can produce individuals, to all external appearance, exactly similar to each other*. Experts of the various genera will, of course, reduce specimens of this sort to an extremely small percentage, but the principle seems a sound one to start from; admittance of one's incapacity is a good step towards real knowledge. A few years ago such a conclusion might have seemed a wild hypothesis, but the study of the *genitalia*, especially in the *Hesperia*, has proved that specific difference can exist without revealing itself by external features in all the individuals. It may be disheartening, but if we give up the practice of naming single specimens and we base our judgment on series of them collected together, hopeless cases will be limited to a very small number of individuals from localities where two allied species fly together; the vast majority are, of course, recognisable.

Starting from this point of view Oberthür need not conclude, as he does at pages 524, 549 and 550, that "at Vernet-les-Bains every grade of transition exists, in the most insensible and incontestable way, between *dubia* and *loniceræ* and at Cauterets between *loniceræ* and *filipendulæ*." Judging from the experience I have gone through with the Italian races, I think he will end by finding, like myself, that the line can be drawn between the species or perhaps that one or two specimens of his series will remain doubtful to the naturalist's eye, although there is little doubt that their offspring, had they reproduced, would have belonged distinctly to one or the other species, just as much as that of any of the most distinct specimens of the series.

As to *anceps*, of which I have a series before me, the case is quite different: both Querci and I have perfectly satisfied ourselves that it contains no *loniceræ* and no *trifolii* and that it is *filipendulæ*, which varies to an extent very unusual in this subspecies and produces frequently some lovely *loniceræformis* individuals and others which might be called *trifoliiformis* on account of their shorter, broader wings and antennæ with a more stunted point beyond the club. This frequency of five-spotted individuals seems very natural, considering the proximity of the locality of *anceps* to the region where *filipendulæ* is replaced by most highly characterised *stoechadis*.

By these general observations on *filipendulæ* and its near ally *loniceræ* I hope I have taken one step towards showing that the *Zygaena* are not as abnormal, compared to other genera, as they had till now appeared. In papers on other species I will try and clear up more problems about them, and in a general paper on the genus I will try to show what an inspiring one it is, when their variations are compared, and how useful it is to make out the few simple lines they follow, because it enlightens one on the more complex phenomena found in other Lepidoptera. I will now try and summarise the geographical variations of *filipendulæ*.

Before doing this I must however explain the method I suggest adopting to designate the gradations of geographical variation. We are beginning to have quite a tolerably good knowledge of the various aspects, that many species acquire in the

whole of their area of distribution, and in fact one may say that most of the work done by Lepidopterists in the last few years has consisted in a more and more minute and exact analysis from this point of view. Hitherto the most striking local variations have been noticed and described. In several species however this part of the task has been accomplished or is nearly coming to an end. It is now a question of gradually establishing their distribution. In endeavouring to do so we are usually confronted by the fact that they blend together in areas intermediate between the regions, where the most striking races had been observed. To complete our mental picture of the variations of a species these shadings must be taken into account and a way of recording them and memorising them must be adopted, or observations about them will be entirely lost. I know this is a sore point for many, but my own experience in more than one branch of science convinces me always more and more that names, and nothing but names, can fix a phenomenon in our brains and hold it in readiness there for future use. On the other hand it is perfectly true that an infinity of fancy names must not be created or they will be more a hindrance than a help; they should be as expressive as possible and convey connections and similarity as well as differentiation. I have already shown in other papers, when dealing with several *Rhopalocera* and *Zygaena*, that in most cases geographical variation is due to quantitative rather than to qualitative differences, and that the races we perceive chiefly consist in the progressive grades of one or more lines of variation, one of which is primary, in the latter case, and the others collateral branches. When we have to deal with a race intermediate between two already described and named I think the following policy will be found practical: If the great majority of individuals are found to belong to intermediate forms and only a few extreme ones, not exceeding a quarter of the total number, are similar to the named races, there should be no hesitation in giving a new name to the series in question, because we can regard it as a distinct grade. We thus complete a series of grades, all, on the whole, quite distinct from each other; they will be numerous when individual variation is usually small in each locality as compared with the extreme variations of the species; they will be few in species which in most localities produce many individual forms ranging broadly in the specific variability. When these distinct grades have been established as a base, cases of intermediate-looking series are reduced to the following:—(a) Individual variation is unusually broad and numerous examples are observed identical with two or more known races. Series of this sort I should designate by a compound name, joining the names of the latter with a hyphen. (b) The series can on the whole be referred to one of the named grades (A), but many individuals exhibit distinct signs of variation towards the next grade (B). I should then use the designation of race *A trans. ad B*. In other localities race *B trans. ad A* is sure to be found and thus our nomenclature will cover all the shades of variation. The following examples of *filipendulae* afford good illustrations.

Oriental sub-species or species allied to *filipendulae*:—I do not profess to know the oriental *Zygaenae* and I will risk no rash judgment on figures, descriptions, or a few specimens. I thus leave aside the interesting *lederereri*, Stålgr. and Rebel, which Seitz says is

connected both with *filipendulae* and *meliloti*, Esp., as well as *gurda*, Led., and *ramburi*, Led., which German writers consider the eastern races of *filipendulae*, whilst Oberthür maintains their specific distinction. As to *rosa*, Obth., I must say it looks uncommonly like standing to *filipendulae* as *graslini* stands to *rhodamanthus*, Esp., and would in this case complete admirably the usual gradation from races nearly entirely red or pink to those nearly entirely dark-scaled found in *stoechadis*.

Sub-species or group of races *filipendulae*, L.:—The races of this group constitute a series, which gradually leads up from the thinly scaled and poorly coloured ones of very cold and damp localities to the gaudy ones produced under more favourable conditions.

Race *mannii*, Herr.-Schäff.—This name is generally used to designate all the small, frail, thinly scaled, dully coloured specimens of the higher Alpine regions. In a broad sense this is quite right, but on examining my series from several localities of the Alps and of the Pyrenees, I observe that in some the antennae and the wings are distinctly shorter and appear thicker and broader, respectively, than is usual in this species, whereas in others, on the contrary, very slender antennae and long, narrow and pointed wings exist. Now, in the original description of *mannii* it is distinctly stated to be distinguished “by its much shorter, less pointed antennae and somewhat blunter forewings.” Strictly speaking, the name should, in consequence, be restricted to the first form mentioned. I must also note that spot 6 is described particularly as “large,” whilst in the narrow-winged form that spot is as a rule reduced in extent. I conclude these two Alpine forms should be distinguished from each other, and I propose the name of *paulula* for the second.

Race *paulula*, mihi, we shall thus have when the latter predominates in a locality. My “types” are from the Stelvio Pass.

Race *arctica*, Schneider, is from the extreme north of Europe; “types” from Grötö (68° N. lat.). It may be similar to *paulula*, but evidently Schneider was right in observing that, to his surprise, it did not correspond in the least to the description of the Alpine *mannii* given by Herr.-Schäffer. I am not acquainted with it; Schneider, however, makes it clear in his description that “on the average it is smaller, more slenderly built, the forewings more blue than in *A. filipendulae*, and the red spots smaller,” and that the hindwings are “rather narrower than in the type form.” What is required is a comparison with the slender form of the Alps, which it seems to resemble more than it does *mannii*.

Race *filipendulae*, L.—The Scandinavian race is the nymotypical one, because Linneus quotes his *Fauna Suecica* at the end of his original description of 1758. Unfortunately I have not been able as yet to see specimens from this region; I suppose it is on the whole similar to the British race, and that, like the latter, it varies considerably, both geographically and individually, ranging from form *arctica* to a form more similar to the ones of the Continent. Oberthür informs me that on the coast of Northern France a race is found quite similar to the English one and he kindly has sent me specimens of it from Cancale (Ille-et-Vilaine). This, I presume, is more or less, nymotypical *filipendulae*. It may be described as exactly intermediate between the races described above and those of Central Europe, which

I am about to deal with. The body is covered with long, thick hair to the same extent as in the former and as described by Linneus in *Fauna Suecica*; the dark scaling is usually more indigo in hue and not as glossy as is usually the case in the races described below; the red is not of so clear and bright a carmine, and on the underside of the forewings it does not form as thick and uniform a red patch, so that the shiny surface of the chitin is seen more, through the thinner scaling. The Cancale examples are even larger than the average *filipendulae*, but others I have from the Isle of Wight are smaller.

A race quite similar to the one just described, so that it can quite well be called nymotypical of *filipendulae* too, is that which is found in most Alpine localities and which constitutes a transition from the extreme *mannii* and *paulula* of the highest altitudes to the races of the lowest and warmest valleys, where *pulchrior* is found N. of the watershed and *microchsenheimeri* or *ochsenheimeri* are S. of it, in Italy. Local variations, observable on comparing series of this race *filipendulae* from different regions, can be designated as *trans. ad arctica*, or *mannii*, or *paulula*, or *pulchrior*.

Race **pulchrior**, mihi. It is quite surprising that no writer should as yet have noticed the sharp difference between the northern *filipendulae* and the race, which is generally distributed in Central Europe, especially in the lowlands. Its characteristics are the absence of a frontal tuft, its thorax and abdomen devoid of hair and covered with scaling as glossy as those on the wing, the brilliant gloss of the dark scaling of the latter, the somewhat clearer, more vivid and warmer tone of red, the denser scaling, particularly noticeable on the underside of the forewings. Specimens collected by C. Höfer in the neighbourhood of Vienna (Klosterneuburg), in July, are good representatives of this grade in the variation of *filipendulae* and I select them as "types." Many entomologists have been struck by the notable variation in the size of this insect. The typical size may be said to be 30-31mm. in the male and 34-36 in the female. In some localities 29 and 30 is the prevalent size and these specimens look a great deal smaller than this difference seems to show, because of their frail build. I have some from the Gumpoldskirche (a hill near Vienna). In many cases one might well talk of a subrace **paupercula**, mihi. In mountains series of specimens are to be collected which can be described as *trans. ad filipendulae* and the same forms are prevalent towards the north, although marked differences occur in localities even not far from each other. Towards the south, on the contrary, as might have been expected, races describable as *trans. ad pulcherrima* make an appearance and these then gradually merge with *stoechadis*, completing the series.

Race **pulcherrima**, mihi. Oberthür has already noted (*l.c.*, p. 500) that the most brilliant French race of *filipendulae* is that of Dompierre-sur-Mer (Charente-Inférieure), in the S.W. of France. I have a large series from this locality, collected by P. Boulé in the first half of June and I think no other race of subspecies *filipendulae* could be larger and more dazzling in colouring, so that I choose it as typical of the last grade, before *stoechadis*. Males vary from 31 to 35mm., females from 36 to 40mm., in expanse. The red spots are always very large, often confluent in pairs and even the usually extremely rare aberration in which they are all united by a broad band along the cubital nervure (*ab. confluens*, Obth.) is comparatively frequent. The

race of subspecies *filipendulae* of the Po Valley in northern Italy is very similar to *pulcherrima* and the red scaling is even more extensive. I have some beautiful *confluens* collected at Palazzolo sull'Oglio by Perlini. The exceptional individuals of race *siciliensis*, Vrtý., mentioned above, also belong to *pulcherrima*.

(To be continued.)

On the occurrence of so called "type" specimens of the ♀ *P. napi* in Alpine regions.

By B. C. S. WARREN, F.E.S.

So much has been published on this interesting species that it is with some diffidence I write this paper; but on more than one occasion there have been references in the *Entomologist's Record* to the capture of typical specimens of *P. napi* in Alpine regions, in company with the var. *bryoniae*. As these records passed without comment, either from the Editorial Staff or the readers of the magazine, it appears that one of the most interesting forms of butterfly life in the Alps has been passed over as a common species of the lowlands, owing to a superficial resemblance between the two forms.

Mr. C. B. Williams, in some notes on Lepidoptera in the Val Formazza, writes, "the two varieties (*napi* and *bryoniae*) here exist side by side and probably intercross. Prof. W. Bateson, who collected at this same locality in 1895 and 1897, caught females of the type form along with var. *bryoniae*." (*Ent. Rec.*, vol. xxviii., p. 6.)

Mr. D. H. Pearson in a note on butterflies taken by him at Binn (*Ent. Rec.*, vol. xxi., p. 264) says, "*P. napi* var. *bryoniae* were also common, and flying with them were a few of the lowland 'form.' That these white ♀s are type *napi* from the lowlands, which have ascended in these localities to the Alpine regions and managed to establish themselves there, appears to be the accepted idea. In point of fact, however, I think there can be no doubt they are nothing of the sort, but the extreme development of a beautiful line of variation of the var. *bryoniae*. I had the good fortune to take a few of these lovely and variable aberrations, a few summers ago; and was able to study their distribution and characteristics, and so became aware of what I believe to be their true origin. In the neighbourhood of Kandersteg, from the beginning of May to July 20th, 1918, *bryoniae* was one of the most abundant and widely distributed butterflies in the district. It was to be seen in dozens in the Ueschinen Tal from 4,000 to about 6,500 ft.; on the Gemmi Pass as far up as, and some way beyond, Winteregg; in the open fields in the Stockenwald; and in a variety of other localities. The vast majority were ordinary *bryoniae* (i.e., the ♀s, with a canary-yellow ground colour, and brown spots and scaling on the upperside), but everywhere among these, occasional examples of the so-called "type" occurred, with a white ground colour and grey spots and scaling on the upperside; but the underside, in the majority of cases, showed the same characteristics in both forms. Owing to the great range of variation of the upperside, the underside of *bryoniae* has been much neglected. It is almost as variable as the upperside, but in the ♀s most usually there is a deep tone of orange-yellow which is never seen in *napi*, except occasionally to a slight extent in ♀s from Ireland.

It now becomes necessary to describe my series of the white forms of the ♀, in detail. In all I have fourteen specimens. Of these eight are of the extreme form, which resembles the spring brood specimens of *napi* more or less closely on the upperside; but underneath, one is of a pronounced *napaeae* form; two are more or less as in type *napi*; and the remaining five approach closely to *bryoniae*, having a deep tone of ground colour which would make them remarkable if they were seen among the lowland race.

Ninth in my series is a beautiful specimen with pure white hindwings and the forewings heavily scaled with grey from the base to the end of the discoidal cell, and the whole length of the inner margin, the usual apical marking being much extended; underside as *bryoniae*.

Tenth, a specimen lightly dusted with grey over all the wings, with a very faint sprinkling of brown scales on the basal areas; underside *napaeae* form, but of a very pale coloration.

The next three specimens are pronounced *bryoniae* forms, in white and grey. The ground colour is only visible between the nervures of the hindwings, but there is a slight dusting of brown in the grey scaling: underside as *bryoniae*.

The fourteenth specimen is a complete *bryoniae* form with the ground colour only dimly visible here and there near the outer and inner margins of the hindwings, and a faint brown scaling at the base of the forewings. Underside as in *bryoniae*. The last four specimens are exceptionally beautiful, and have the appearance of being slate-coloured.

I also have four specimens of a transitional form, with the ground colour neither white nor yellow, and the scaling a mixture of grey and brown. Although of a very extreme *bryoniae* form, they have a lighter appearance than less heavily marked specimens of ordinary *bryoniae*. Now, of the fourteen specimens just described, twice I took two in one day, and the other ten were all taken separately in a number of isolated localities, with a range in altitude of quite 2,500 ft., and on dates ranging from May 11th to July 16th. To these can be added one more white specimen which I saw but failed to catch, making a total of fifteen. In every locality where I found these single specimens, ordinary *bryoniae* occurred literally in dozens. It therefore follows, that even if the individuals of the white forms were bred from eggs laid by a white ♀, about ninety-eight per cent. of the brood must have been true *bryoniae*, or have perished. Add to this the fact that five out of eight of the extreme white specimens have the underside of *bryoniae*, and one that of *napaeae*, and I think it seems most natural to conclude they all are the offspring of *bryoniae*.

Now any collector relying on such records as those already quoted, on capturing this series would have recorded the first eight specimens as type *napi*, and the other six as hybrids between *napi* and *bryoniae*. Accepting this, it follows, of necessity, that as Mr. Williams suggests *napi* and *bryoniae* "exist side by side" in these localities right up to 6,500 ft. This does not seem a very satisfactory theory, to say the least of it. But, let us consider what it implies. In every locality where I took either the supposed types or hybrids, as such their presence implies that a pure strain of *napi* exists in that locality and must do so in moderate numbers; otherwise it must soon fail to maintain itself among the

swarms of *bryoniae*. If this were so, a certain number must have come in my way as well as the hybrids, which one would expect to be the rarer of the two. But what did I find? Throughout the whole duration of the flight period of the species (for I was fortunately on the ground from before the emergence began until it was practically over) I only saw nine of the supposed type examples, of these, one I failed to catch; five (as already stated) have the underside of *bryoniae* and so must also be regarded as hybrids; one is of the *napaeae* form and can only be regarded as doubtfully typical (for why should *napi* produce the characteristic feature of the summer brood of the lowlands, in May at 5,000 ft. ? and also it must be remembered that this form of underside is commonly found in *bryoniae* ♀s), so there remain but two possible type specimens, from separate valleys, to represent (with the possible addition of the one not captured) the type race on which depends the existence of these supposed hybrids. The theory that a certain number of *napi* migrate from lower levels annually, need not be considered seriously; for apart from the extreme improbability of individuals reaching great altitudes in so many small Alpine valleys each year, it would have to be supposed that they were practically all ♂s. For if even one or two ♀s were to migrate also, a large number of pure type eggs would be laid; as no ♀ could travel the necessary distance without pairing before she reached the *bryoniae* zone. No more, I think, need be said of that impossible theory. If *napi* and hybrids between it and *bryoniae* exist in the Alps, then the type race of *napi* must be permanently located there. In the Kandersteg district there can be no doubt that this is not so; and I should need very strong proof to believe it is in any other part of the Alps either. I strongly suspect, too, that if the white ♀s which have been recorded as type *napi* from other localities were examined, a large proportion of them would be found to show some *bryoniae* characteristic.

That such specimens have only been recorded from a few districts, and continue to recur in those few localities and not elsewhere, may be brought forward as proof that they are *napi* and not *bryoniae*; and so only appear when the former manages to establish itself at high levels. On second thoughts, however, it will be seen that this is most improbable. To begin with, there is really no proof that these forms do not occur everywhere that *bryoniae* does. That they are very rare there can be no doubt. Out of the hundreds of *bryoniae* I saw in the neighbourhood of Kandersteg during the best part of three months, I only came across fifteen of the pale coloured forms; although always especially looking for them. In localities where *bryoniae* is not so abundant these aberrations would doubtless be proportionately less in evidence; and it is more than likely that in the past, on many occasions, collectors keen on capturing dark *bryoniae* have passed these white ♀s by under the impression they were ♂s, or if the sex was noted, just as *napi* and not worth consideration. It is then, quite probable such specimens exist everywhere in the Alps, only they have not been recorded. Another point to be noted, is that the extreme white ♀s did not occur at Kandersteg above 5,000 ft.; while the supposed hybrids occurred from 3,800 to about 6,500 ft. This being so, how is it that the hybrids exist 1,500 ft. above the highest level to which the type ascended? Mr. Williams notes that Professor Bateson

took type-like specimens at 5,500 ft.; but 5,000 ft. in the Bernese Oberland is equivalent to an altitude of 6,000 ft. in Eastern Switzerland.

This apparently impossible state of things is, however, quite easily explained if we assume all these interesting forms to be aberrations of *bryoniae*. If a certain combination of meteorological influences, direct and indirect, tend to produce, aberrationally, a form of *bryoniae* approximating to the lowland race; it is only to be expected that such a line of variation should attain its greatest development at the lower levels, although transitional forms occur at any altitude where *bryoniae* exists.

Mr. Williams actually bred such transitional specimens from eggs laid by *bryoniae*; and he especially notes that all the ♂s he observed in the locality where he captured the ♀ were very heavily and darkly marked. Further, it is most probable that the extreme white type-like aberrations are the offspring of some of the transitional forms. Another question now must be considered. How can one reconcile the fact, that two of my extreme white ♀s have the underside of *napi*, and so resemble that race almost exactly, and the certainty that other such specimens will occur in the future, with the theory that they are aberrations of *bryoniae*? This question is no real difficulty: as noted before, the underside of *bryoniae* is very variable, and among the ♀s, specimens with a very similar underside to spring *napi* occur occasionally; the two specimens under consideration therefore, are most probably only the outcome of a simultaneous development of two forms of variation common to *bryoniae*.

When specimens of *bryoniae* are occasionally taken in the lowlands of Central Europe and in Ireland, it is not suggested that they are hybrids, for the simple reason that it is obviously impossible; yet in reality it is probably just as impossible that the *napi*-like specimens of the Alps are hybrids either. One more proposition can be brought forward, namely, that the extreme white aberrations are *napi*, and the transitional ones aberrations of *bryoniae*. If this were so, then the first eight specimens of my series would be called *napi* and the others *bryoniae*. But of the first eight, those with the underside approaching *bryoniae* would have to be regarded as aberrations tending towards *bryoniae*, or as hybrids. The latter has already been considered, but if we assume the former, then it is but so slight a step to the ninth specimen of my series that it would have to be considered an aberration of *napi* too. And if so, why not the tenth and all the others? That would include those specimens taken at 6,500 ft. which is obviously impossible. Conversely if the transitional specimens of high altitudes are to be taken as aberrations of *bryoniae*, then so must the same forms from lower levels, and so on until we get to the five specimens we started from; and if they are *bryoniae* it is certainly more logical to conclude the two type-like specimens to be a further development of the same form, than to call them *napi*, and assume that that race exists in certain Alpine regions, but can only produce one or two specimens in each locality each season. That latter conclusion may, I think, at once be called impossible. Indeed it is difficult to see that any sufficient argument can exist for maintaining that *napi* could ever establish itself in the *bryoniae* zone; for if it could do so, it implies that the conditions necessary to the white race of ♀ exist in certain Alpine regions, in which case *bryoniae* would

have disappeared in those particular localities. It seems then, there can be no real doubt that these beautiful pale-coloured forms, whether white, or completely suffused with grey, or of any intermediate form, are only aberrations of *bryoniae*; indeed it is to me impossible to see how their origin could otherwise be satisfactorily explained.

Having once come to this conclusion, these pale aberrations become objects of the greatest interest. Writing of *bryoniae*, Kirby, in his "Butterflies of Europe," says: "Some writers consider that this butterfly is a survivor of the Glacial Epoch, and that *bryoniae* represents the form of the species which was then in existence." There is ample support for this theory if one considers some of the features of the European races of *napi*. We see, for example, the specialised underside of the spring and summer broods; the universal white ♀; the very distinct Irish race, with its strong tendency to narrower and more elongated wings, the deeper coloration not infrequently seen on the underside of the ♀s, the frequent appearance of a yellowish ground colour on the upperside in the same, and the occasional *bryoniae*-like specimens, which also occur rarely elsewhere in the lowlands. All these (excepting the aberrational *bryoniae*) independently developed features are characteristic of, and typical in, their own sphere and their own season; yet, a fair series of *bryoniae* taken in one locality can produce individuals of each form flying together at the same time, and without doubt often hatched from the same batch of eggs.

The co-existence of all these characteristics in one race and that race the one indigenous in the Arctic and Alpine regions is so suggestive, that one may say for certain that a cold-loving *bryoniae* form existed everywhere in the lowlands of Europe at the close of the last Glacial Epoch. The great interest attaching to the pale aberrations of *bryoniae* will now at once become apparent. Existing aberrationally in those days in the plains, as they now do in the Alps, and favoured by the changing climatic conditions, they increased and developed. Who can doubt that we see the result to-day, and that the universally distributed ♀ *napi* of the lowlands originated in this manner?

When in the future, a collector has the good fortune to take one of these beautiful aberrations of *bryoniae*, instead of designating it a hybrid between two insects which almost certainly do not inhabit the same plain of altitude, he will know it to be but a simple aberration. But that humble prefix will be to all who use it, a direct reminder of the origin and true significance of these white or slate-coloured *bryoniae*; which in themselves are an unfailing testimony to the existence and activity in the present day, of that fundamental but undefinable energy which in past ages responded to the changing circumstances and gave rise to a new race of insects, to replace the disappearing type. And so these aberrations are, and will remain, not only for us, but for generations of Entomologists yet to come, a living memorial to the changes of the far past.

NOTES ON COLLECTING, Etc.

GAVARNIE NOTES.—ADDENDA.—Referring to my notes on Gavarnie, etc., in the January number of the *Record*, Mr. B. C. S. Warren has very kindly gone through my black and white skippers and the result

is as follows:—Luchon, *Hesperia alveus*, *H. serratulae*, and 1 *H. foulquieri*; Gavarnie; *H. carthami*, *H. alveus*, *H. serratulae*, *H. malvoides*, and *Pyrgus sao*.—DOUGLAS H. PEARSON (F.E.S.), March 28th, 1921.

CURRENT NOTES AND SHORT NOTICES.

The Hon. Treasurer of the Wicken Fen Fund reminds us that we make an appeal in the "merry month of May" for contributions towards the cost of a watcher to protect the wild life of the place from undue attacks, and to see that no encroachments take place which would be detrimental to the objects of the Trust. At every opportunity the area is added to by the acquisition of any portion which may come in to the market. Annual subscribers are reminded that contributions are now due, and others whose ability and sympathies coincide are hereby earnestly requested to add their names to the list of supporters by sending to Mr. W. G. Sheldon, Youlgreave, S. Croydon, the Hon. Treasurer of the Fund.

We have been requested by the Hon. Secretary of the Entomological Section of the Birmingham Natural History Society, of which our colleague, Mr. G. T. Bethune-Baker, is the President, to ask our readers if during the coming season they could furnish either by loan or gift a living larva or pupa of any local or rare species of British Lepidoptera to Mr. Foster Newey, who is a delineator of remarkable accuracy and excellence, and is engaged upon a work on the British Lepidoptera. He has already figured the greater proportion of the British Macrolepidoptera, but there are about 240 species and forms which are still in his desiderata.

The Editor of the *Entom. News*, who is happily able to dwell with rural surroundings, in the course of his varied occupations, states that his attention was turned to the long period in the history of civilised peoples in which progress in Zoology was very slow, and felt how difficult it was for a present day zoologist to realise what must have been the mental attitude of many a cultured Egyptian, Greek, or Roman towards insects. He was suddenly called to more mundane matters by the advent of the butcher, who when his business was transacted observed that the coming winter was likely to be cold only in its latter part—"because he had been feeling the caterpillars along the road and they were hard to the touch *only at their hind ends*."

The following leading article which appeared in *The Times* on March 3rd last, refers to our esteemed colleague, Professor W. M. Wheeler, the eminent biologist and myrmecologist.—"HIGHBROW" PHRASES.—"Professor W. M. Wheeler, a learned and witty American biologist, has recently addressed a genial remonstrance to his scientific fellow-citizens on their devotion to resounding phrases. His remarks deserve a wider application, and are very pertinent to ourselves. The current watchword of the elect, he says, the "highbrow" toast" of the moment, is "organization." Wayward, individual, pursuit of knowledge is out of fashion. It is distasteful to the bureaucratic spirit of the age, it tends to overlapping of effort, and it exalts personal reputations, possibly and regrettably those of obscure unofficial people. The committee is the thing. The problems must be set, the parts allotted, the results received, edited, and issued by the authority of

men sitting round a table. There must be sub-committees and super-committees, joint committees and special committees. How also shall we control genius, encourage mediocrity, and secure "team-work?" How better can science present a respectable front to Governments or offer responsible hands for grants-in-aid? A detached individual is an unstable creature; he may die, neglect to report, get off the lines, or make discoveries of a very upsetting kind. A committee is safe; its existence secures continuity and is a guarantee against the precipitate production of uncomfortable truths. But the PROFESSOR fears that the chief product of organization is organizers, and that in elaborating our machinery we forget its purpose. Fortunately, however, mankind is wiser than any of its generations and has a knack of creeping out of the hard shells it continues to secrete. "Organization" is the fad of to-day, and will be as ephemeral as its predecessors. "Culture" was one of these. But "culture" died, and its corrupt body became decadence when, ceasing to be a mental attitude, it became an intonation and a set of opinions. Progress was another; but that has hardly recovered from the shock of the war, which gave us good reason to distrust some aspects of modern civilization. Now even popular preachers find it safe to mock at "progress." The truth is that a conception seldom becomes crystallized in a phrase until it has outgrown its most fertilizing activity. Ideas have their cycle of life; they are born of the great, named by the dull, and killed by common usage."—H.D.

We quote again. American of course. "One of the noblest decisions on record, so far as bald-headed men are concerned, has been handed down by the Supreme Court of Maine. It is notorious that a bald head has a peculiar attraction for the common house-fly. He prefers to roost there or promenade there to any other place in the neighbourhood. Now the high court has declared the bald-headed persons are entitled to protection. A hotel-keeper sued because the defendant, who had contracted for accommodations for a certain period, left the hotel before the time had elapsed. The defendant said he was pestered by flies, which were particularly numerous in the dining-room. The august court held that the fly is a nuisance and its disease-carrying characteristics are well known. A patron of a hotel was warranted in leaving the establishment, regardless of a contract for a longer stay, if the dining-room was infested with the pests. An innkeeper, it declared, agreed by implication to furnish accommodations compatible with the prices paid, the standing of the hostelry and the class of persons invited to become patrons. 'Accommodations,' the judges asserted, included apartments, dining service and sanitary conditions, and if the hotel-keeper failed to maintain these in inviting and wholesome manner the patron was warranted in seeking quarters elsewhere, regardless of an engagement to remain for any specified time."

In the *Can. Ent.* for December there is a plate of figures with descriptions of six new species and forms of Macro-lepidoptera from British Columbia. There is also the first portion of an important article on the Nervous System of a Lepidopteron with two plates of details.

The January number of the *Irish Nat.* contains a few notes on th

Lepidoptera of Poynzpass, Ireland, during 1920, by the Rev. W. T. Johnson. It is noted that *Pararge aegeria* was the first butterfly to appear, on April 24th, and the last to disappear. It seemed always turning up even in drizzling rain and the writer was struck with its hardiness. This is exceptionally interesting as the species appears to be disappearing from so many of its English localities. The year was not a good one for Lepidoptera on the whole as it was so wet with practically no summer. Still *Pyrameis atalanta* put in an appearance in September.

The *Can. Ent.* is now edited by Dr. Jas. McDunnough, of the Dominion Entomological Branch, Ontario, who is well known for his "Contributions to the Natural History of the Lepidoptera of North America" and the "Check List of the Lepidoptera of Boreal America." Dr. E. M. Walker has been editor since 1910, when he succeeded the Rev. C. J. L. Bethune, by whom the magazine was started in 1869.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

January 13th, 1921.—NEW MEMBERS.—Lord Rothschild, of Tring, and Mr. F. W. Enefer, of 2, Blackheath Vale, were elected members.

THE RARE *M. UNIONALIS* IN SUSSEX.—Mr. R. Adkin exhibited a *Margarodes unionalis* taken near Abbott's Wood, Sussex, and gave notes on the occurrence of this interesting migrant.

LOCAL COLEOPTERA.—Mr. Blenkarn, local species of Coleoptera including *Henoticus germanicus*, Craven House, Strand, *Necrophorus interruptus*, Box Hill, *Cassida hemisphaerica*, Chiswick, four species of *Hydroporus* from Coatbridge, etc.

RHOPALOCERA OF CALIFORNIA.—Mr. Hy. J. Turner, a box of butterflies sent to Mr. Sperring by our member Mr. G. B. Pearson, from California, including fine series of the spring gen. *galactinus* of *Coenonympha californica*, of the dark *Melitaea*, *M. chalcodon*, and *Papilio rutilus*, *Anthocharis sara* forms, *Colias eryphyle*, summer form *eurytheme*, *Brephidium exilis*, one of the smallest butterflies of the world, (*Lycaena*) *avalon*, only found in S. Caterhina Island, S. California, several *Hesperiidae*, etc., etc., and read a communication on the exhibit from Mr. Pearson.

FORMS AND RACES OF *P. GLYCERION*.—Mr. T. H. L. Grosvenor, *Papilio glycerion* and its races and allied forms from Sikkim and Thibet.

LYCAENA ARION.—Mr. B. S. Williams, *Lycaena arion* from Cornwall.

PHOTOGRAPHS.—MESSRS. H. Main and A. E. Tonge, photographs of items in life-histories of common insects and ova of Lepidoptera respectively.

January 27th, 1921.—ANNUAL MEETING.—There was a large attendance. After the formal business was completed, the President, Mr. K. G. Blair, read his address, "Insects in Winter," and votes of thanks were passed.

ORDINARY MEETING.—AN IMMIGRANT ORTHOPTERON.—Mr. Step exhibited a large locust, found alive at large in Covent Garden with a small crowd of timorous watchers around.

COLOUR VARIATION IN *D. SERICEA*.—Mr. Coppeard, a series of colour forms of the water-plant beetle *Donacia sericea*.

RHOPALOCERA FROM S. AFRICA.—Mr. Turner, a box of Rhopalocera sent from near Port Elizabeth, S. Africa, including the cosmopolitan *Lampides boeticus*, a fine series of the Satyrid *Leptoneura chytus*, and species of *Pieris*, *Terias*, *Teracolus*, *Mycalopsis*, and *Pamphila*.

A WINTER NEUROPTERON.—Mr. Lucas, the Neuropteran, *Hemerobius stigma*, now common on Esher Common.

VARIATION IN *P. ICARUS*.—Mr. Leeds, 177 different forms of male *Polyommatus icarus*, named from the descriptions given in J. W. Tutt's *British Lepidoptera*.

REVIEWS AND NOTICES OF BOOKS.

THE LEPIDOPTERA OF THE CONGO. By W. J. Holland. *Bull. Amer. Mus. Nat. Hist.*, vol. xliii., Art. vi., pp. 109-369, December, 1920.—Dr. W. J. Holland, Ph.D., L.L.D., Director of the Carnegie Museum, Pittsburgh, is to be congratulated on the production of this important contribution to African Entomology. It is entitled "Lepidoptera of the Congo," being a systematic list of the butterflies and moths collected by the American Museum of Natural History Congo Expedition, together with descriptions of some hitherto undescribed species.

Since the publication of Professor Aurivillius' "*Rhopalocera Aethiopica*" in 1898, no paper on African Lepidoptera has appeared which is of such importance faunistically as the present one. The collections were obtained by Messrs. Lang and Chapin during 1910, and principally at Medje, near the Nepoko River, but many were collected at Mangara and Faradje in the district of the Uelle River.

Seven hundred and twenty-five forms are dealt with, of which 243 are butterflies. Two new genera of *Nymphalidae* are described, 37 forms of new butterflies, and 40 new moths.

There are 261 pages of text, nine plates in colours, and several text figures. The plates are excellent examples of the photographic process. A feature of the work is the very complete index which gives references to families, genera and species, also species under genera, to synonyms, and to figures. New names of genera, species, and varieties are printed in heavy-faced type, also the main reference is a series of references, whilst synonyms are printed in italics. This sort of index is too rarely found in works on Lepidoptera.

The forms listed are numbered in consecutive order, and the forms in each genus are similarly numbered.

A list of the localities mentioned in the paper is given with their approximate longitude and latitude, and we trust that future writers on Lepidoptera will do the same. It is often annoying to be unable to locate a particular place which is very often of too small importance to find its way into a map or gazetteer. Another commendable feature of this paper is a list of the new forms described giving their type localities and page reference. We notice also that Dr. Holland

has taken pains to give, wherever possible, a reference to the most easily accessible illustration of the species. Again, the actual number of specimens taken of each species is stated, so that we have an idea of the frequency of the form during the period of its collecting.

We regret that the author does not distinguish between an individual aberration and a sub-species when writing the name of a form. Some distinction ought to be made. If instead of writing *Acraea pentapolis thelestis*, one wrote *Acraea pentapolis* f. *thelestis* or ab. *thelestis*, it would be understood that an aberration and not a sub-species was meant.

Dr. Holland has erected the genus *Kallimula* for the *Kallima*-like forms hitherto placed in the genus *Precis*. The genus is founded on the shape of the wings and general pattern. It occurs to us that since seasonal dimorphism is a feature of this group, with consequent variation in the shape of the wings, dry season forms, especially females, acquiring a more falcate forewing, the founding of a genus on these characters is open to question. A study of the early stages and of the genital armature is really necessary in a case of this kind.

The second genus is founded by Dr. Holland on *Neptis exaleuca*, Karsch, which he places in *Neptidomima* on account of the structure of the palpi. We have no comment to make here. Dr. Eltringham is engaged on a study of the African *Neptis*, and the comparative anatomy of the genital armature will indicate whether the genus erected for *exaleuca* can stand.

We must call attention to the figure of *Cymothoë herminia*, Grose-Smith, on plate viii. f. 1. This does not represent the type form which is much more like fig. 2 representing *poensis*, Holland. To our mind it is doubtful whether figure 8, on the same plate is really the ♀ of *langi*, Holland. There is as much reason to regard it as the ♀ of *staudingeri*, Auriv. We are equally doubtful whether the form represented on plate 1, f. 9, is the ♂ of *Cymothoë angulifascia*, Auriv. It is figured by Hewitson as *altisidora*, and we think it is the ♂ of *adelina*, Hew. We do not know why Dr. Holland considers figs. 1 and 2 on plate x. to be sexes of the same species, whilst fig. 8 is represented as the ♀ of a very different species, and regret that no reason is given in the text. He has been at some pains to elucidate the perplexities of this difficult genus, but we must confess that it is more perplexing than ever.

On page 247 the author gives the name *fumosus* to the dark form of *Papilio ridleyanus*. This name must unfortunately sink to the earlier one of *fumatus* given by Niepelt in *Lep. Niepeltiana*, vol. ii., p. 23, pl. xxiii., fig. 4 (1916).

Some difference of opinion will always exist in dealing with the status of obscure and difficult forms, so that if the author's treatment of these forms invites discussion an impetus will be given to their study, and the value of Dr. Holland's work cannot be said to be impaired thereby.

We commend this volume to all students of African Lepidoptera, as it adds much to our knowledge both of forms and of their distribution.—GEORGE TALBOT (F.E.S.), The Hill Museum, Witley. February 28th.

We regret to hear that Dr. Longstaff passed away on Saturday evening, May 7th.—J.H.D.

Subscriptions for Vol. XXXIII. (10 shillings) should be sent to Mr. Herbert E. Page, "Bertrose," Gellatly Road, New Cross, S.E. 14 [This subscription includes all numbers published from January 15th to December 15th, 1921.]

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AND

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EDITED BY

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A Fortnight at La Sainte Baume (Provence).

By G. T. BETHUNE-BAKER, F.L.S., F.Z.S., F.E.S.

(With two plates.)

La Sainte Baume is but fifteen miles from Marseilles, but except on Sunday it is impossible to get through in a day as there is only the early morning motor charabanc. We therefore were obliged to take a slow train to Aubagne on June 28th, and in this case indeed it was slow, for when about half-way there we were pulled up in front of a stranded train, that on enquiry proved to be the back half of a heavily laden goods train, whose engine had been unable to ascend the incline from this point up to Aubagne, where the more level way is resumed. The difficulty had been solved by uncoupling half of the train and leaving it on the line with the signals against us and here we had to wait while the two portions of the goods train that preceded us were dragged up the hill by the engine whose powers had been so decidedly over-estimated.

We consequently arrived at Aubagne, a small manufacturing town, about two hours late, but as we were staying there for the night, time was less important than it might otherwise have been and we were content to have arrived there at last, fortunately in plenty of time for dinner. The motor was due to start for La Sainte Baume between 7 and 8 o'clock in the morning, and having taken our seats the steep and wonderful ascent soon began, up and up we went round curves and angles that none but the most experienced chauffeur could have negotiated, but the topmost ridge was reached in under three hours and by about 11 a.m. we found ourselves drawn up in front of the Hôtellerie, and M. Pedone ready to receive and welcome us to his interesting establishment.

Déjeuner would be served at twelve o'clock, so we had time to look around, to begin to take our bearings and to realise that we were again in "old Provence," and as we now look back to those delightful days I am constrained to give the picture so sweetly sung by our good friend and fellow entomologist writing under the sobriquet of Oliver Grey.

. . . . Beneath my feet a maze
Of gemmed mosaic, where the cistus white
Shows the earth with limpid chrysolite ;
Hedges of rosemary, and upland ways
Thick-set with lavender ; warm rocks ablaze
With red valerian ; and, flashing bright
Among the black-branched ilex, butterflies
Sulphur and scarlet-robed, by poets named
"The Glory of Provence." With such fair dreams
I charm the solitude that darkest seems
Here in our England when, 'neath sullen skies,
Spring on the threshold lingers all ashamed.

This beautiful spot has already been described elsewhere (*Entomologist*, xlvii. 14), by the late Frank Lowe, but so that my readers may be able to visualise it more easily it will be well to say that the Hôtellerie stands at the foot of a high rocky escarpment about five or more miles long, whose base northwards is fringed by the remnants of an old forest of various trees, oaks and beeches, poplars and sycamores,

JUNE, 1921.

ilex and firs of many kinds, whilst in front to the north the ground gradually rises into low undulating eminences more or less covered with stunted brushwood, and whose rocky surface is traversed everywhere by deep and long fissures that often require great care to cross, especially when a much desired butterfly gaily flies over and airily settles on a bough on the other side and while you warily pick your way and see your net is ready for the stroke, it daintily soars upward toward the blue whence it is lost to view. This part of the landscape in its general features bears a strong resemblance to the scenery of Algeria.

The best collecting ground is without doubt along the edge and in the openings of the forest already referred to. The uncultivated land in the near vicinity to the Hôtellerie facing north and on each side was very stoney, but well covered with a carpet of aromatic herbs, which gave out a sweet scent as one wandered across it, here I turned up a nice little series of *Scolitantides baton*. *Satyrus briseis* also occurred in this area, whilst *S. circe* was always to be found around a large tree just outside the hotel quadrangle. At the back of the establishment was a field of grain, a very light crop that had just been harvested when we arrived, and here I took *Pontia daplidice* and *Pieris rapae*, an occasional *Leptosia sinapis*, and both *Colias croceus* and *C. hyale*.

Two or three days after our arrival it was pleasant to greet, after dinner, Mr. Gerard Gurney, who had also come with a similar object in view to our own, and the next day we had the pleasure of meeting Mr. Main and Mr. Symes, surely a curious coincidence that we should meet quite independently in this interesting spot so far away from home. The edge of the woods at the back, east and west, was a favourite hunting ground, and there my wife and I often wandered among the lavender bushes that were so abundant. I was on the look out especially for any *Zygaenidae* and for *Polyommatus dolus*, which my friend, Frank Lowe, whose death we so much regret, had found only at Nans. It had now extended its range very considerably and was fairly common throughout the district. At first it seemed rare and it was evidently only just beginning to emerge, but soon it became fairly common. *Zygaena astragali* var. *provincialis* was by far the most abundant species of this genus, *Satyrus circe* occurred everywhere though not very abundantly, *Epinephale lycaon* was common, and I obtained some very nice females, both sexes belonging to the form *lupinus*, whilst *Coenonympha dorus* was the commonest of its genus and very plentiful, I took also *C. arcania*, a nice large race of the typical form. The three other *Coenonympha* taken are all three *lyllus* not *pamphilus*. I fear I did not take the trouble to catch many of these for they were present in fair numbers, and I now wish I had taken more, as I consider *lyllus* a distinct species, the genitalia being different in certain points. In these woods *Dryas paphia* was very common, the females being large handsome specimens; the form *valesina* also occurred, one falling to my net whilst several others fell to the share of my friends. In *Epinephale jurtina* race *hispulla* all the males I took have traces of tawny patches below the apical ocellus. *Melanargia galathea* was abundant everywhere, decidedly darker than our British form and also darker than those I have taken in the Alps, but they are certainly not as dark as the southern *procida*. It is

curious that the race of *jurtina* should be the southern race whilst *galathea* is certainly not the Mediterranean form. Referring again to the *Argynnidae* I took one and only one very magnificent *Argynnis cydippe* (*adippe*), whilst the four specimens of *A. niobe* are all of the form *eris*. *Issoria lathonia* of course occurred, and I obtained a few *Brenthis dia*, though they were evidently on the wane. Of the genus *Melitaea* none were really common, but *M. didyma* was the most plentiful, and all the females I captured were of the pale form, none at all of the dark or of the green forms. I took one *M. athalia*, a few *M. cinxia* and a few *M. phoebe*. *Limenitis camilla* was generally distributed, but by no means as common as elsewhere. *Leptosia sinapis* was very abundant and its white summer form *diniensis*. *Gonepteryx* (*Rhodocera*) *cleopatra* was very plentiful in both sexes, but I only took one male *Gonepteryx rhanni*, and one large beautiful *Colias croceus* v. *helice* was also netted by me. The lavender bushes on the edge of these woods were perhaps the most fruitful locality at least for the *Lycaenidae* and *Zygaenidae*, though *Polyommatus dolus* was not much attracted to them. The form *vittata* of this last was by no means so common as the type form without the white stripe below. *Polyommatus icarus* was common, and flying alongside of it and almost but not quite as plentiful, was *P. thersites*, at least I have determined them as *thersites* though I have not yet found time to dissect out the genitalia, but they are evidently the same as my *thersites* from Italy. *Polyommatus coridon* was very common and the majority of my long series is of an unusually large size. *Lycaenopsis argiolus* was rare and showed nothing of the depth of colour that we often get in the second British broods.

A very pleasant day to the Col Bretagne with Mr. Gurney, produced a nice series of *Satyrus cordula*, all beautifully fresh, there I also took two fine large females of *Papilio podalirius*. A few *Satyrus semele* a nice brightly contrasted form in both sexes were also captured, but on the other side of the Col a very cold driving wind prevented us getting *Zygaena lavandulae* as I had hoped to do. I took however a few *Pararge megera*, larger and brighter than the English race, *Argynnis cydippe* (*adippe*) also occurred and *Melitaea athalia*. On July 2nd my wife and I made an excursion to old Nans, 800 feet below us, on a glorious day; and after we had turned down the steep short cut I captured several *Strymonidae* that I had not seen before in the locality, also one *Ruralis quercus*. I took a moderate series of *Strymon ilicis*, one ab. *cerri* and two or three *Strymon spini*. Perhaps the most notable thing on this most brilliant and very hot day was the song of the Cicadas, it went on without a moment's cessation and at times its volume and loudness were remarkable; at a particular spot there seemed to be one that had a very exceptionally high and loud "note," so much so that I had tried to spot him, there he was at the very end of a branch of a tall fir tree seated right on the tuft of the fir needles, he looked even at that height three or more inches in length, but there was no mistaking him looking in the brilliant sunshine as black as coal, almost like a roll of patent leather. After lunch I wandered up the hill at the back of the Hotel de Lorges, and seeing as I thought a nice *Papilio machaon* on a flower head I went for it and to my delight found I had netted a perfectly fresh specimen of *P. alexanor*, this I believe is a new record for this species.

My friend Rowland Brown tells me he cannot trace it being recorded from this district. I also took a beautiful *Zygaena carniolica* race *occitanica*. Another day in company with Mr. Main and Mr. Symes we went to the east end of the escarpment and were very successful with the general run of species already mentioned, but in addition I took a couple of fine *Ruralis quercus*; we had been told that *Laeosopsis roboris* was to be found here, but we were quite unable to find it, I took, however, *Zygaena sarpedon*, and one or two *Zygaena briseis*, also *Z. carniolica*, mostly ab. *heydesari*, whilst two or three *Z. fausta* were also captured. A couple of fine and perfect *Papilio podalirius* fell to my net and a nice little series of *Polyommatus escheri*, about which I have more to say elsewhere.

On another day we three went over to Riboux, a plain on the south side of the escarpment, on the top of which is the chapel of St. Pilon, here I took more *Satyrus cordula* and also *S. alcyone*, whilst lower down among the trees I captured one or two *S. hermione*. It was an intensely hot day and we missed the track that makes in zigzags the steep descent, so we decided to go straight down the side of the hill, and having covered possibly half or more of the steep scramble downwards we rested awhile, glad of the welcome shade of a few trees. Here after a few minutes breathing space on looking round I saw some delightful rocks bathed in the full blaze of the sun; "Come," said I, "here's just the place for *Satyrus filia*," and suiting the action to the word I got up and almost before I was aware of it, a flash, a stroke, a back hander, and there was a perfect specimen of the butterfly; as I looked at the beauty my thoughts travelled back to before the war to the last time I took it, at Ille sur Tet, in the Oriental Pyrenees. Then we proceeded on our way and ere very long arrived down on to the plain of Riboux and soon found the well we were in search of. Here were the usual cattle troughs made out of the trunks of trees, and as the water evaporated they were greatly frequented by wasps and butterflies, prominent among the latter being *Polyommatus dolus*, and *Hesperia fritillum* race *cirsii*, *H. foulquieri*, *H. malvoides*, and *H. sav.* In this plain *Satyrus briseis* was fairly common but very strong in flight and difficult to catch; nevertheless I got a nice little series, the form however in this hot dry plain is not quite so large as elsewhere in Provence and is darker than usual. I think we were all well satisfied with our day and I enjoyed it thoroughly.

Among other insects I took a nice series of *Platylabus (aegon) argus*. *P. argyrognomon* also occurred and a nice little lot of *Rumicia phlaeas* fell to my net mostly of the *eleus* form, but some, quite typical of the first generation, were probably laggards of it.

Thymelicus acteon was not rare, and *Adopaea flava (linea)* was common as was also *A. lineola*; of *Erynnis (Carcharodus) alceae* I took but one. I did practically no "dusking" at all and therefore my catch of the Heterocera was quite small.

La Sainte Baume is a very interesting spot from more than one point of view. Apart from the natural history of the district and its natural and scenic peculiarities and beauties, it has many old world interests; the Hôtellerie was from the thirteenth century, until the disfranchisement of 1904, a religious house of the Dominicans, and many are the legends connected with the famous grotto in the escarpment and with the little church of St. Pilon on the summit. They

are all steeped in beautiful stories of Mary Magdalene and her life in the Grotto, and I gather that there is no place in the south of France to which so many pilgrimages are made, for the pious and poetical Provençals are able to accept all that is written and come to worship at the shrine in large numbers.

It was also most picturesque to see the gathered in grain emptied out in the farmyard (if such you can call the level area just outside the Hôtellerie) and the horses brought to tread out the corn; round and round they went under the guiding hand of one of the men until the chaff was separated; after which the whole pile was well covered up waiting for the "mistral" or other strong wind to rise, when it was again uncovered and forked so that the chaff was easily blown away, whilst the grain of course fell back and was then "bagged" in the usual way. I must not close without a word of thanks to Monsieur Pedone who managed the Hôtellerie; a large new wing has been recently added to the old house and there is now ample accommodation for all comers, and Monsieur is kindness itself, always ready to help in case of need or to give any information that he possesses.

An Essay on the Systematic Study of Variation in the Races of *Zygaena filipendulæ*, L., and of its subspecies *stoechadis*, Brkh.

By ROGER VERITY, M.D.

(Continued from p. 91.)

At this point of the description of the successive grades in the variation of the species I must make a short digression. A few words must be said about the wing-pattern of the *Zygaena* in general, to make the more complex variation, which follows, better understood, although I am sorry to have to touch this vast and difficult subject, here, in an inadequate way. The markings of the Lepidoptera are of two sorts: the **nervular suffusion or pattern** and the **true or transverse pattern**. The former originates on the nervules and diffuses more or less broadly on either side, forming a streak, which may be either shaded or sharply outlined; along the outer margin of the wing these streaks often broaden considerably and blend transversally in a marginal band, which usually has a shaded internal outline; they also often blend in a uniform shade at the base of the wing, but this shade may also be originated by the following pattern, when it exists. The true or transverse pattern originates within the internervular spaces, usually making an appearance under the form of two dots (one on either side of the central crease or rudiment of an atrophied and obliterated nervule): the origin of these spots is clearly shown, for instance, by the minute black specks of *Spilosoma menthastri*, Esp., and of *Spilaretia lubricipeda*, L. A definite number of transverse series of these dots exists in the various groups of Lepidoptera; in the vast majority of cases the two dots are blent across the crease in one larger spot and very often these blend transversely also across the nervures into bands, which cross the wing from costa to dorsal margin, such as in *Arctia hebe*, L., which can be usefully compared to *Zygaena fausta*, L. Here again two sorts of true pattern are clearly discernable, in most cases, and sometimes even three. These I should call **primary**, **secondary** and **tertiary** pattern, because, as a rule, the first is much more dark in colour than

the two others; these in the vast majority of cases constitute that lighter colouring which is wrongly described as "the ground colour," when the mistake is not carried so far as to call "ground colour" even the primary pattern, simply because it has more extent than the secondary pattern. In the *Zygaena* the dark indigo or greenish scaling is the primary pattern, the red or yellow is the secondary pattern, and the real ground colour, which is white or yellowish, is only left uncovered in *Z. ephialtes*, L., or in rings round the spots of the forewing of other species. In this genus the patterns are of the very simplest description, and, in fact, they are not much more complex than in the lowest of the Lepidoptera, the *Micropterygidae*, but the original bands are so fused together that they are not discernible at first sight. Variation is thus carried on in its very broadest and simplest lines, making it well suited to a study of its fundamental laws, as I have already mentioned. We must note first of all that there are species of *Zygaena* which never produce the true primary pattern, the nervural pattern existing alone: this is the *purpuralis*, Br., group; the consequence is that the red scaling forms longitudinal bands and never splits transversally into spots. There are, on the other hand, species in which the true pattern exists alone and the nervural pattern is quite absent or very rudimentary: this is the *fausta*, L., *fraxini*, Mén., and *carniolica*, Sc., groups; the consequence is that the red spots can blend transversally across the nervures, but never form longitudinal bands as in the group mentioned above; in aberrant individuals, they may be united by one central band along the cubital nervure, when the transverse bands are interrupted at this point, but this, too, is due precisely to the absence of nervural pattern. Between these two extreme groups extend all the other species, in which the nervural and the true primary pattern exist together and in which variation consists in the various combinations of their different degrees of development.

Returning to *filipendulae*, we find it stands in the series of species last mentioned and that it combines the nervural and the true primary pattern. This explains a phenomenon in its variation that would otherwise have been puzzling. I think the order in which I am describing the races is the natural one, because it corresponds to the successive transitions from one to the other as one finds them in nature. Now, in this series it will be noticed that from *manni* or *paulula* to *pulcherrima* the dark markings become less and less extensive and the red ones proportionately more and more so, whereas in the races of subspecies *stoechadis*, which I am about to deal with, the dark markings increase from the races closely connected to *pulcherrima* to the most distinct *stoechadis* ones. This sudden inversion of the process of variation would be difficult to explain. The remarks I have made on the wing-pattern of the *Zygaenae* give us the clue by showing that the inversion is only apparent and that we have, on the contrary, only one progressive series of variation or, perhaps, rather, two series diverging from *pulcherrima* and leading up to *arctica* or *paulula* on the one hand and to *stoechadis* proper on the other. In the former it is the nervural pattern which decreases in extent from *paulula* to *pulcherrima*, in the latter it is the true or transverse primary pattern which increases from *pulcherrima* to the darkest *stoechadis*. We thus

easily see that *filipendulae* simply follows the fundamental law of variation of the wing-markings of the Lepidoptera, according to which in the successive subdivisions of each group the same variations tend to reproduce themselves on a minor scale, except that character or those characters, which become more or less invariable in each case and distinguish that group. The *arctica* branch of *filipendulae* corresponds to the *purpuralis* group of species, the *stoechadis* branch to the *fausta*, *carniolica*, etc., group. It must also be noted that these two types of markings are so generalised in the Lepidoptera, that, under the same conditions of environment, they are actually produced in as distant a Family as, for instance, the *Pieridae* in *P. napi* races *arctica* and *bryoniae*, up to the extreme form *radiata*, and the summer broods of race *meridionalis*, Rühl., up to form *dubiosa*, Rüb., whilst in the genus *Pieris* in general the *napi* group of species corresponds to the *purpuralis* group of the *Zygaenae* and the *rapae* group corresponds to the *fausta*, *carniolica*, etc., group.

Another distinctive character between *filipendulae* and *stoechadis*, which can be explained by the fact that the true primary pattern is more developed in the latter than in the former, consists in the frequent obliteration of spot 6th in *stoechadis*, whereas it never disappears even in the darkest forms of *filipendulae*. To follow up the cause of this we must begin by finding out the origin of the 6th spot. It will be noticed that in a great many, if not in nearly all the Lepidoptera, there exists, just about the third or hindermost terminal branch of the median nervure, a zone of wing in which the pattern is reduced in extent, evidently because that branch is itself atrophic; it should consist in branches 3 and 4 in which the hind median nervure should fork, as does the fore median nervure in branches 1 and 2; the four branches all exist in early stages of the wing in the chrysalis; the atrophy of pattern is generally more conspicuous on the underside of the hindwing. In the *Grypocera* there exists a fold in these wings, which stretches across them in front of that nervure and which no doubt is connected with the phenomenon I am describing in the pattern. It is in this intervular space that, for instance, the eye-spot of the *Satyridae* is smaller than in the other spaces, or even absent. It is in the next internervular space, just at the back of the third median nervure, that the true secondary pattern (the grey or fulvous, so-called, ground-colour) on the underside of the hindwings of the *Lycaenidi* is often cancelled and leaves a triangular space of the real, white, ground-colour uncovered. This important part of the wing I propose calling the **atrophied zone**, because it is obvious that the development of the wing-markings is impeded there and kept some grades back as compared to the grades reached on the greater part of the wing-surface. In *filipendulae* and other *Zygaena* the sixth spot is placed precisely astride of the third median nervure of the forewing and the dark marginal band of the hindwing is narrower on or just at the back of the same nervure, when its inner outline is waved and it varies in breadth. This seems to show obviously enough that when on the forewing the dark marginal band becomes so broad on most of its length as to join and blend with the preceding band (that which crosses the wing beyond the end of the cell and separates spots 5th and 6th from each other) it is in some cases kept back in the atrophied zone and, remains narrower; the consequence is it does not

join the other band there and what, in respect of the dark pattern, can be called a space, is left between them; this is spot sixth. What I wish to point out is that the atrophied zone in the *Zygaena* does not affect the true primary pattern or affects it extremely little. If we examine *Z. carniolica*, Sc., in which the nervural pattern does not exist, or nearly so, we find that usually the marginal band and the preceding one are separated on most of their length by a long kidney-shaped space or red spot; in southern races, where this space gets obliterated in some individuals by the unusual extent of the primary pattern, one sees that, whilst the fusion of these bands begins at the two ends of that space, at the same time the latter gets rapidly much narrower, being invaded both from the innerside and the outerside, so that at the end of the process there remains nothing of the space but two or three minute round specks at quite a distance from spot 5th. No stage is thus gone through similar to the 6th spot of *filipendulae* elongated outwardly. If we now examine series of *Z. purpuralis*, Br., where the nervural pattern exists alone, we can on the contrary notice that, when the marginal band broadens, in many individuals it does not do so uniformly on all its length, but it exhibits a deep incision in the atrophied zone. This incision is not separated from the end of the red band corresponding to spot 5th, as it is in *filipendulae*, because there exists no primary band to do so, but it obviously is homologous to spot 6th. These two observations, which are the counterparts of each other, show very clearly that in *filipendulae* the marginal band is constituted both by that of the nervural and that of the transverse pattern, but that the former is usually (or specifically) narrow in the atrophied zone, so that spot 6th can only be obliterated when the true pattern acquires the high degree of development it has in *stoechadis*. Another character pointing to the same conclusion is that when spot 6th is reduced to a very small size, its last vestige in the darkest forms of *stoechadis* is more usually quite at a distance from spot 5th, whereas in subspecies *filipendulae* and in forms of *stoechadis* more similar to *filipendulae* it is often very near or even confluent with it. In the first instance it is clear that reduction is due to broadening of that band of the true pattern, which extends between spots 5 and 6, and that the nervural pattern has nothing to do with this process. It seems reasonable therefore to suppose that also in the second instance the true pattern as a rule invades the 6th spot by the broadening of its marginal band and that the nervural pattern only joins in this process in rare cases, in which it is unusually developed and behaves as in the darkest *achilleae*, Esp., tending to abolish the incision of the atrophied zone from the outer-side inwardly.

Other instructive observations we can make by comparing successively the underside of hindwings, the upperside of same, the underside of forewings and the upperside of same, especially in the dark forms of *stoechadis*. We find that these are four progressive grades in the extent of the same markings.

From all these remarks and many others one can, to my mind, conclude that the principal variation of *filipendulae* consists in a dissociation of the nervural and of the true or transverse patterns, and in the consequent development in the extent of that of the two which predominates. Schematically this process, pushed to the extreme, could be pictured by an entirely red form, having also the forewings

similar to the hindwings of sub-species *filipendulae*, by two series diverging from it, one exhibiting a progressive increase in the extent of the nervural pattern, the other exhibiting that of the transverse pattern, and by a number of series between these two, in each of which both nervural and transverse pattern would exist combined together in different proportions. But this scheme is not a creation of my fancy; it exists in nature; it is the *Zygæna* genus. The two extreme series are embodied by that which leads from *Z. rubicundus*, Hb., up to the darkest *purpuralis*, Br., and by that which leads from *Z. laeta*, Hb., up to *fausta*, L., *carniolica*, Scop., etc. In a paper on this genus in general I will show how its variations can be traced to a beautifully definite and ordinate plan, sufficient to overthrow any theory on natural selection of fortuitous variations.

Races intermediate between subspecies *filipendulae*, L., and subspecies *stoechadis*, Brk.:—

Race **anceps**, Obth., *Ét. Lép. Comp.*, IV., p. 551 (1910). "Bouches-du-Rhône et Var (Hyères, Sainte-Baume, Saint-Zacharie, Montrieux, Saint-Pons)." Such are the localities given by Oberthür for this very interesting race, which I have already talked of. I need only add here that by its build, by the aspect of many individuals very similar to subspecies *filipendulae*, by the tone of red and more especially by the marginal band of hindwings being always narrow it belongs on the whole more to *filipendulae* than to *stoechadis*. On the other hand, however, the reduced red suffusion of the underside of forewings and the numerous five-spotted individuals bring it very near *stoechadis*.

Race **alpina**, Boisduval, *Icones Hist. Lep.*, p. 65, pl. 53, fig. 9 (1832-41). Oberthür discusses Boisduval's description and concludes that his insect must have been the one which is found at Digne; Boisduval only gives the "Alpes françaises" as locality; he thought it was very probably referable to *angelicae*, O. Oberthür keeps it under this heading, but expresses doubts as to its correctness. I do not know it, but from the lengthy descriptions of these authors I should say it is a small mountain race transitional between *filipendulae* and *stoechadis* and similar to its neighbour in localities less elevated, *anceps*, by its great variability. Like it, it seems to approach *filipendulae* by the marginal band of hindwings, more usually narrow and by the very extensive red suffusion of underside of forewing in many individuals, whereas it approaches *stoechadis* by being often five-spotted and by a few males having the hindwing broadly darkened. The **angelicaeformis**, mihi, form noticed by Boisduval only occurs occasionally.

Race **pulcherrima-stoechadis**, mihi. This interesting race from the hills above Reggio Emilia (Borzeno) and Modena (Rio Spigone in the colli di Scandiano) on the extreme southern limit of subspecies *filipendulae* in Italy, I have already mentioned in dealing with transitions between it and *stoechadis*. A large percentage of individuals belong distinctly either to the one or to the other, and now and then, in the second case, even to forms *medicaginis* and *stoechadis*, much darker than are ever found in race *ochsenheimeri* from Southern Italy and to the five-spotted one. A. Costantini of Reggio has sent me a large series to examine and he has kindly left me part

of it. Of the transitional individuals some can be described as form *pulcherrima* trans ad *ochsenheimeri*, the rest as form *ochsenheimeri* trans ad *pulcherrima*.

Subspecies or group of races *stoechadis*, Borkh.:—

Before describing the different races I must make one or two general remarks, which will help to understand the way they are linked to each other. To begin with let us note that in the female sex of this subspecies there exists what might nearly be called a dimorphism, because the extremes of its variation have very different aspects indeed; the interesting point is that they correspond to subspecies *filipendulae* and *stoechadis*, just as these correspond on a still more magnified scale to the extreme variations of the entire genus. One of these forms can be described simply by saying it is identical to *pulcherrima*; what obliges us to classify it amongst the *stoechadis*, even when it is found alone as in race *calabra*, or it prevails, is that it is not accompanied by any male of the same form, that sex consisting entirely of most perfect *ochsenheimeri*. It is well represented by that figure on pl. 5 of Seitz' *Grossschmett*, vol. ii., which is, as we shall see presently, wrongly named "*hadjina*": size usually very large, wings elongated and acuminate, scaling less thick than in the *stoechadis* which are really characteristic, colouring less saturated both in the dark and in the red markings, red spots of forewing very large, sixth spot usually blended with fifth and also projecting outwardly very much, dark margin of hindwing extremely thin, being limited to the fringes and of perfectly uniform breadth, red suffusion of the underside of forewings about as extensive as is ever seen in *filipendulae*; it will be found convenient to name this form *pulcherrimaeformis*; it nearly invariably differs from *pulcherrima* by the tone of the red, which is colder, lacking the slight tinge of yellow mixed with it in the latter. The other female form stands opposite to this one by the shape of its wings, the dense scaling, the saturated and brilliant colouring; its markings vary in extent as much as it is possible in any *Zygaena*, from a form which only differs from *pulcherrimaeformis* by its structure, by its more limited spots on forewing and by its marginal band of hindwing (slightly broader generally and widened particularly at apex and between the cubital and the anal nervures), to the form with only five spots on forewing and the hindwing nearly entirely darkened.

A bird's eye view of the geographical variations of subspecies *stoechadis* is interesting: we find that the races one can call on the whole melanic extend from the Maritime Alps to Piedmont and Liguria, and thence along the chain of the Apennine at medium and high altitudes, as far as the depression which unites the valleys of the Metauro and that of the Tiber, and which marks the limit between the Tertiary geological formation of the mountains up to that point and their Jurassic one southwardly. The culminating point of melanism is reached exactly in the mountains above Lucca and Pistoia in northern Tuscany. Out of this region of melanism, the extent of the true pattern is seen to decrease progressively as one gets further from it to the W. and to the S., so that the reddest races are found in the W. of France and in Sicily, but to the N. the change is very abrupt in the Po valley, as we have already seen. The Balkans I cannot deal

with for want of information, all I read about them being very vague and confused. Spain I must also leave to future investigation, because for the present I have found no evidence of the existence of *filipendulae* there at all. Race *seeboldi*, Obth., which I have seen, as already stated, I refer to *lonicerae*. Oberthür's description of *kindermannii*, Boisd., from Barcelona, suggests to me another darker race of the same species. Burgeff's (*Mitteil. Münchner Ent. Ges.*, 1914, p. 61, pl. III.) *gemina* from Sierra Segura, collected by Korb, may be a constantly five-spotted *stoechadis*, with a narrow marginal border to hindwing, but even its author's declaration "that the genitalia easily distinguish it from *lonicerae*" does not quite satisfy me. Turning to the Eastern Mediterranean region, we find two races have been described: *syriaca*, Obth., which does not seem specifically distinct from *stoechadis*, and *hadjina*, Stdgr., from the Taurus Mts. The original description of the latter is the following: "Like *dubia*, but with spots 3 and 4, 5 and 6 of forewings further apart." This distinctly points to a marked form of *ochsenheimeri*, and Seitz's figure mentioned above cannot be correct, as it represents a female with those spots so large as to be quite close to each other and the two last quite confluent. It may belong to a high-mountain race, collected at a greater altitude than Staudinger's types and standing to *hadjina* as *calabra*, Vrtý., stands to *ochsenheimeri*, O., in Calabria, or else the female of *hadjina* may be dimorphic, like the Italian *ochsenheimeri* is in some localities, and this is an individual standing opposite to the nyctotypical form.

Group of races constantly six-spotted on forewing, with a broad red suffusion on underside and with very narrow or narrow marginal band on hindwing (*tenuissimelimbata* to *latelimbata*), but with no other primary pattern:—

Race *siciliensis*, Vrtý. (*Bull. Soc. Ent. France*, 1917, p. 222). This is the less variable of the races of *stoechadis*, for all the individuals of both sexes are most *filipendulae*-like; so much so, that in my original description I actually said it was difficult to decide which of the two it should be grouped with. More material and more experience show me now that I was right in considering it a *stoechadis*; the larva is identical with that of *stoechadis*, *ochsenheimeri* and *calabra* and they all exactly correspond to Spuler's fig. 25a on pl. ix. of *Die Raupen der Schm. Eur.*; in the imago the structure of the body, antennæ and wings and the markings of the forewing above are quite as in those *ochsenheimeri* individuals which have the red more extensive; the female in these respects quite belongs to the characteristic *ochsenheimeri* and so little does it tend to vary in the *pulcherrima* direction that one specimen of *pulcherrimaeformis*, found by the Quercis amongst hundreds examined, stands out prominently in my series, as if it had got mixed in it by mistake. What instead strongly recalls *pulcherrima* constantly is the extremely narrow dark margin of the hindwings very often of uniform breadth even in the male and the dense and extensive red suffusion of the underside of forewings in both sexes. Never are these characters found to such an extent in any male *ochsenheimeri*; in the female they are found in form *pulcherrimaeformis*, but never associated, as in *siciliensis*, with the typical *ochsenheimeri* characters. My "types" are from the hills of the neighbourhood of Palermo.

Race **calabra**, Vrtý. (*Bull. Soc. Ent. France*, 1917, p. 223). At a very high altitude (Piano di Carmelia, m. 1200, on the Aspromonte) in Calabria Querci has discovered a most interesting race. The male is a grade further on, as compared with that of *siciliensis*, along the *stoechadis* line of variation and it can, in fact, be described as identical with *ochsenheimeri*, but the female is instead a grade further back than *siciliensis* and constantly belongs to *pulcherrimaeformis*. The result is a much greater sexual dimorphism than exists, on the whole, in any other *stoechadis* race. Following the usual rule in Calabrian races, *calabra* is of large size and not smaller than *ochsenheimeri* of the plains, like the mountain races of Central Italy.

Race **calabra-ochsenheimeri**, mihi. On the Coast Range, at S. Fili, at about m. 900, another Calabrian race was found in June, 1920, which is quite intermediate between *calabra* and *ochsenheimeri*. A large percentage of the females belong distinctly either to one or to the other, the rest are transitional; this compound name designates perfectly the marked dimorphism of this sex, which characterises the race; the male is, of course, an *ochsenheimeri*, like that of *calabra*.

Race **major**, Esper [*Schmett.*, Suppl. *Sphing.*, p. 19, pl. xli., fig. 4 (1793, not 1789, as stated by Tutt, because on the same plate is figured *exulans*, which Esper at p. 17 says was found in 1792)]. It is quite surprising how all authors quote this name as a synonym of *ochsenheimeri*, Z., when it is fifty years older than the latter. Esper's figure is rough, but unmistakable, and his description, comparing his insect "from the south of France" with the German *filipendulae*, and including size, brilliant colouring, broader and more sinuous marginal band on hindwing, shows once more what a wonderful eye that entomologist had for his times. Oberthür in his *Ét. Léop. Comp.*, iv., p. 547, includes in *ochsenheimeri*, Z., both the Sicilian and the race from Montpellier, besides the one from Central Italy. The first I have shown to be distinct; if the two latter are quite similar to each other it seems to me inevitable that the name *major* should replace the one of *ochsenheimeri*. A closer comparison of adequate series will however, I believe, reveal some difference, which will make it worth while utilising the former for the race from the south of France, and the latter for that of Italy.

Race **ochsenheimeri**, Zeller (*Isis*, 1847, pp. 303-7). Tutt and Oberthür both note that this name was given by Zeller to Ochsenheimer's description of what he called *transalpina*, a name which of course could not stand, having been used by Esper for a totally different insect. Oberthür very rightly applied the name to those races of *stoechadis* which are always or nearly always six-spotted and which have, comparatively to the other *stoechadis*, a very narrow marginal band on hindwing. This made things much clearer than they had been left by Staudinger, followed blindly by Seitz, Dziurzynski and others, who kept up an inexplicable distinction between "*stoechadis* var. *dubia*, Stdgr.," and "*filipendulae* var. *ochsenheimeri*, Z.," but furnished no clue, either in their descriptions or in their habitats, as to what they meant by them. Evidently they had never made out the distribution of *filipendulae* and of *stoechadis*, and they had in mind some wrong idea about them. In the next paragraph I will deal with the name of *dubia*, Stdgr., which authors of the last century found so convenient to cover their difficulties

and which in most cases was applied to what should have been named *major* or *ochsenheimeri*. Staudinger probably used this last name for the forms more similar to subspecies *jilipendulae*, namely for those I have now named *pulcherrimaeformis*, *calabra*, and *siciliensis*, and he used the name *dubia* for the forms with a broader marginal band to hindwing. This view would not be sustainable, because Ochsenheimer clearly describes this band as "sinuate" and also because the broad habitat of "Italy and Southern France" he gives makes it highly improbable he should have meant to describe the comparatively rare *pulcherrimaeformis*, or the local *calabra* and *siciliensis*. I quite agree with Oberthür in referring the name broadly to all the races of *stoechadis*, which are constantly or nearly constantly six-spotted in the male, as well as in the female, and which have the hindwings entirely red, with a narrow marginal band as in Seitz's figure, but more sinuate than in his male. The distribution of these races corresponds to the region mentioned by Ochsenheimer, plus the Balkans and Asia Minor. Now I have separated the Sicilian race, one can add to the description of the remaining *ochsenheimeri* that in the male sex the red suffusion of the underside of forewings is distinctly less extensive than in *jilipendulae*, being reduced to a narrow central streak, which unites the spots, and furthermore that the marginal streak of the hindwing on both surfaces is broadened into a narrow, but distinct band with a more or less sharply defined and sinuate inner outline; in Seitz's figure of female it is much too broad. I have already mentioned that the race of the south of France will probably be separated under the name of *major*, Esp. This leaves continental and peninsular Italy to *ochsenheimeri* proper. On comparing the specimens I have collected in the hot valleys of South Tyrol, of the Adige and the Isarco, with my series from Latium and Central Italy generally, I notice in most specimens a distinct difference in the tone of the red scaling: the former have a slight tinge of yellow in it which make it more similar to that of *pulcherrima* and thus more brilliant, the latter are of a colder, more saturated and duller red. I believe this difference must have been noticed by Staudinger and that is why in his *Catalog. Lep. Pal. Faun.*, 1901, p. 384, he distinguishes a "var. **campaniae** (Stögr. i. l.)," describing it as "*intensius picta*." The specimen sold by Bang-Haas under this name and figured by Seitz, with no description, but which is too dark to be from the Campania, and the entirely opposite description given by Dziurzynski in his *Pal. Arten der Gatt. Zygaena* (Berl. Ent. Zeit., 1908), which suits the *ochsenheimeri* of the Campania much better, show that none of them had made out what Staudinger meant. If this be accepted as a distinct race, the name *ochsenheimeri* would be limited to that of the Southern Alps. As this character is so subtle and not constant I leave the question open. Calberla (*Iris*, viii., p. 218, 1895) describes under the name of **judicariae** a form with the red spots surrounded by white rings found in South Tyrol, north of the lake of Idro. This would seem a very distinct local race, for in no locality have I ever seen a tendency to produce this form, but here too I must leave the question open. A race, I think on the contrary should be distinguished, is described in the following paragraph. Other local variations, besides the transitions to *calabra*, consist in gradual transitions to race *etrusca* (see below), which begin by the

appearance of five-spotted males and then by a broadening of the marginal band of hindwings in an increasing number of individuals of that sex. Even in South Tyrol I have seen a few from Terlan and one in the Trent coll. with the hindwings nearly as dark as in nymotypical *stoehadis*, but there is, as a rule, no tendency to produce these dark forms in that region. Those races of Central Italy which constantly point in this direction can be called race *ochsenheimeri* trans ad *etrusca*, Vrtý.; they are parallel to the French *pyrenes*.

Race *microchsenheimeri*, mihi. Size varies so markedly and contributes to produce two such distinct-looking extreme races, that I feel justified in proposing a new name. In the Aurunci Mts. (Southern Latium) Querci has found a very large and brightly coloured *ochsenheimeri*; near Rome and in South Tyrol the size is not so excessive, but still large. On the contrary in the Mainarde Mts., at Villalattina, m. 500, quite a small race is produced with body and antennæ more slender and with wings narrower, primary pattern darker and duller, red less bright. Count Turati has kindly sent me in exchange a series of specimens from Primaluna, m. 550, in Val Sassina (lake of Como) which is quite similar to the one of the Mainarde (the five-spotted form is found in about 5% of the males). Unfortunately we still greatly lack in knowledge concerning the distribution of the various races of *stoehadis* in the Basin of the Po. Specimens I have seen collected in various localities of Piedmont by Signor Gianelli of Turin agree perfectly, however, with *microchsenheimeri* both in size and in the tinge of the dark and of the red pattern, so that those forms, which also agree with it in the limited extent of the dark markings, do not differ from it in the least and the name should be used for the races of that region consisting chiefly in six-spotted, narrow margined individuals. We shall see that nymotypical *medicaginis* and *stoehadis* are also from that region; *microchsenheimeri* only differs from them by the greater extent of the red secondary pattern. Races corresponding to the designation of *microchsenheimeri* trans ad *medicaginis* or to that of *medicaginis* trans ad *ochsenheimeri* will no doubt be found locally and also *microchsenheimeri-pulcherrima* because *pulcherrima*, as already stated, is quite frequent in the Po basin.

M. Rondou has sent me from Gèdre, m. 1000, in the Hautes-Pyrénées a little series which does not differ in the least from the Italian ones and contrasts sharply with specimens of *pilipendulae* race *mannii*, H.S., from the same region; I can detect no signs of transition between the two, so that I suppose the first is found at the bottom of the valley of Gèdre and the second in higher and colder spots, but Rondou had not noticed the difference and could give me no information about them. As a rule size decreases as altitude increases, but local causes create exceptions, such as the large race of the Aurunci Mts., in Southern Latium found from 400 to 1200 m. I possess a little series of *microchsenheimeri*, some of which of very small size, collected as high as 1500m., at Casteldelmonte in the Abruzzi, on the Gran Sasso:—

Race *microchsenheimeri* trans ad *montivaga*, mihi.

(To be concluded.)

Hippodamia variegata, Goetz.—Some Observations on the type of this Species.

By G. B. C. LEMAN, F.E.S.

In the course of the preparation of a paper on this species, at the suggestion of Mr. Horace St. John Donisthorpe, (which I hope to publish later on), I have had occasion to look up Goeze's original description of his type, and I find that the type has *nine* spots and not thirteen spots as subsequent writers appear to have assumed.

Goeze's original description of his type is to be found in his *Entom. Beytr.* i. 246 [1777], and is as follows:—

“I. Zur ersten klasse: rothe oder gelbe Flügeldecken, schwarze Punkte.

1. Variegata, der Scheckrücken.

Geoffr. Ins. Tom. I. 322. No. 5 [1762].

La coccinelle rouge à neuf points noirs et corcelet varié.

Coleoptris rubris, punctis novem nigris, thorace nigro, antice albo.”

I have verified the reference to Geoffroy, and his description is as follows:—

“5. Coccinella coleoptris rubris punctis novem nigris, thorace nigro, antice albo.

La coccinelle rouge à neuf points noirs et corcelet varié.”

In 1785 Fourcroy in his *Ent. Par.* i. 144-5, in giving names to Geoffroy's descriptions, appears to have overlooked *H. variegata*, Goetz., as he gives the name of *Coccinella carpini* to Geoffroy's No. 5:—

“5. C. carpini.

La coccinelle rouge à 9 points noirs et corcelet varié.

C. coleoptris rubris, punctis novem nigris, thorace nigro, antice albo.

Loc. Habitat carpinum. [Hornbeam].”

and consequently *C. carpini*, Fourcr., is a synonym for *H. variegata*, Goetz.

Within the limits of these preliminary observations it is not possible to deal with the many individual authors who have written on this species, whether under its original name, or as *Coccinella* or *Adonia*, *mutabilis* or *variegata*, and I propose therefore to refer only to some of the more modern writers.

Mulsant (1846) in his *Séc.* pp. 39-44, *Adonia mutabilis*, Scriba—the latter's description is incidentally extremely vague and difficult to follow—states definitely that the “état normal” has 13 spots arranged as follows: 1, 2, 2, 1 and $\frac{1}{2}$ (the common scutellar spot), and relegates the type to his var. G.ξ.—“L'huméral et les trois derniers.”

Mulsant's references include Geoffroy's No. 5, *C. carpini*, Fourcr., and *mutabilis*, Scriba, but he makes no reference to Goeze.

In 1879 Weise in his *B.-T.* pp. 92-94, under *Adonia variegata*, Goetz., gives the following formula for the disposition of the spots in the type:—

“Flgd. roth, neben dem Schildschen weisslich, mit 13 Schwarzen P. 1, 2, 2, 1, $\frac{1}{2}$.”

and includes the type as a variety under his section f.:—

“f. Flgd. mit 9 P.

ii. P. 1, 4, 5, 6, $\frac{1}{2}$ (*9-punctata*, Schrank) . . . v. *carpini*, Fourcroy."

Weise reiterates the above in his 1885 edition so far as the type is concerned, but in the rearrangement of his sections he includes under *carpini*, Fourcr., the following groups, for which there appears to be no justification:—

"e. Fld. mit 9 P. aa. 1, 4, 5, 6, $\frac{1}{2}$ (*9-punctata*, Schrank; *carpini*, Fourcr.); bb. 1, 4+5, 6, $\frac{1}{2}$; cc. 1, 2, 3, 5, $\frac{1}{2}$; dd. 1, 3, 4, 5, $\frac{1}{2}$; ee. 2, 4, 5, 6, $\frac{1}{2}$; ff. 2, 4+5, 6, $\frac{1}{2}$; gg. 2, 3, 4, 5, $\frac{1}{2}$ (*arenaria*, Sajo); hh. 3, 4, 5, 6, $\frac{1}{2}$ (*biconstellata*, Sajo) . . . v. *carpini*, Fourcroy."

Ganglbauer (1899) in *Käf. Mitteleur.* follows Weise.

Reitter (1911) in *Faun. Germ.* iii. p. 137, also gives the "Normal-färbung" as "mit 1 schwarzen Sch.-Punkt. u. jede Fld. mit 1, 2, 2, 1 Punkten," and his figure 10, "*Hippodamia variegata*," has 13 spots corresponding with the formula 1, 2, 3, 4, 5, 6, $\frac{1}{2}$.

The only record I have so far found of the correct description of Goeze's type is in the *Hist. Col. France* of Sériziat. p. 349 (1883):—

"*A. mutabilis*, 4 mm., tête fauve avec le front noir; corcelet fauve orné d'un dessin noir à quatre branches: élytres rouges portant chacune trois points noirs en triangle sur l'extrémité postérieure et un petit point huméral. Il y a de plus un petit commun sur l'écusson."

I should be very glad to receive any data relating to this species from any collector who has specimens in his collection, with, if possible, diagrams showing the position of the spots and the thoracic markings of each specimen.—152, West Hill, Putney, S.W. 15.

NOTES ON COLLECTING, Etc.

ENTOMOLOGICAL NOTES FROM PUTNEY FOR 1920.—*January 20th.*—The seven-spot Lady-Bird (*Coccinella 7-punctata*, L.) on my gate post. It was seen every day for over a week on the gate, fence, and sage plants near.

January 24th.—The Sage Frog-hopper (*Eupteryx melissae*) abundant on the sage, where it occurs all the year round. On July 18th it was observed in cop, when the sexes unite back to back.

January 25th.—The honey bee (*Apis mellifica*) out on path.

February 3rd.—*Geotrupes spiniger* on path.

February 11th.—Queen Wasp (*Vespa vulgaris*) on pavement; another seen on the wing, February 13th.

February 13th.—The church-yard beetle (*Blaps mucronata*) on pavement.

April 5th.—Fish Insect (*Lepisma saccharina*) common in the kitchen near fire-place. This is the first time I have seen it at Putney. It was also common this year in the house of a friend.

April 13th.—The small White (*Pieris rapae*) flying in the High Street, Putney.

April 14th.—The large White (*Pieris brassicae*) flying in my garden.

April 24th.—*Creophilus maxillosus* running on pavement; it "feigned death" when touched.

April 25th.—*Apion radiolus* observed to be abundant on the Holly-hocks in my garden.

May 16th.—*Megatoma undata*; a fine specimen of this beetle was found in a bedroom in my house.

May 21st.—The first Lace Wing Fly noticed in my garden.

May 22nd.—*Ptinus 6-punctatus* taken in the bath-room. It is over 40 years since I last took this beetle, when it was also found in a bath-room in my father's house at Earls Shilton.

May 23rd.—*Mycetæa hirta*; this little beetle which is often found in cellars, was inhabiting a fungus high up on a plane tree.

May 27th.—*Clytus arietis* occurred in my garden.

May 28th.—*Gastrophysia polygoni* on pavement.

May 29th.—The stag-beetle (*Lucanus cervus*) ♂ on fence in Putney Park Lane.

May 30th.—*Tortrix pronubana* flying in road. On September 24th a number of specimens were observed at 1.15, hovering over a garden hedge.

June 18th.—The Painted Lady (*Pyrameis cardui*) in my garden.

June 21st.—*Hylobius abietis*, a specimen was picked up in my road.

July 6th-12th.—*Anthrenus* (*Claviger* ?) larva died while I was away. It was taken in my study in July, 1917, changed its skin in July and October, 1918, and July 5th, 1919.

July 15th.—*Pseudococcus gahani*, this Coccid, which has only been recognised recently in England, was crawling on the outside of my study window. Other specimens were seen in the same situation on October 16th and 29th.

July 17th.—*Rhagonycha fulva* in garden.

August 7th.—*Corticaria linearis* flying in garden; also the Red Admiral (*Pyrameis atalanta*). The latter was again seen in the garden on October 20th.

August 13th.—The small Tortoiseshell (*Aglais urticae*) flying in garden.

August 23rd.—*Ptinus tectus* in bath. This is the first record for Putney of this beetle, which has spread all over the country during recent years.

August 28th.—A grass-hopper (sp. ?) was seen jumping in a road in the town; on 31st I saw another specimen in my garden.

August 29th.—The Devil's Coach-horse (*Oxyypus olens*) on road.

September 1st.—The Meal worm (*Tenebrio molitor*) on the pavement.

September 15th.—*Pentatoma rufipes*; this large bug was picked up in Hazlewell Road.

September 20th.—A male wasp (*Vespa vulgaris*) noticed on pavement, and a male and female together on 22nd.

September 29th.—A wasp (*Vespa vulgaris*) worker was observed flying in the evening with something white in its jaws. On being captured it was found to be carrying the remains of a moth (*Luperina testacea*).

November 7th.—A number of Aphids were taken crawling on a wooden fence on Putney Common. Mr. Laing tells me they consisted of the following species:—*Tuberolachnus viminalis*, Boyer; *Brachyeolus frequens*, Walker, this species has not been found since 1848; *Therioaphis betulicola*, Kalt., ♂ and ♀ ♀; *Euceraphis betulae*, Kalt.; *Siphia schontedeni*, Del-Guer. (= *glyceriae*, Walker nec Kalt.), not been found in Britain since 1846; and *Euceraphis carpini*, Buckt. The same species were found still walking on this fence on November 14th and

21st, and in addition on the last date, *Hyadaphus (Cavariella) capreae*, oviparous ♀ ♀, and *Tuberolachnus viminalis*, Boyer, numerous alate and apterous specimens, and a few pupæ.

November 9th.—*Quedius impressus* on the wing in the road.

November 10th.—Male Wasp (*Vespa vulgaris*) on pavement; and *Cyphon variabilis* on my study window.—H. DONISTHORPE, Putney.

CURRENT NOTES AND SHORT NOTICES.

The Interim Report of the Mosquito Investigation Committee of the South-Eastern Union of Scientific Societies has been submitted to the Ministry of Health and has been described by Colonel James as "interesting and valuable." Will all those who have had Circular No. 4 dealing with *Anopheles plumbeus* and are participating in getting data on this species kindly communicate at once with the Hon. Sec., the Rev. T. W. Oswald Hicks, B.A., "Lesware," Linden Road, N. 15. Information is particularly required (A) of the habits and breeding places of *A. plumbeus*, and (B) its distribution as a larva and as a full-grown insect. It is an easy matter to send these "gnats" in folded paper in an envelope, as they can then easily be identified by an expert. Copies of the interesting circular are still obtainable from the Hon. Secretary.

In the *Bull. Soc. ent. France* for February is a list of the Microlepidoptera of the Island of Oleron (Charente-Inférieure), by C. Dumont, which he has recently obtained and which brings up the total number of species of Micros already reported to 280. There are included 5 *Coleophora*, only 1 *Lithocolletis*, the very local Psychid *Luffia lapidella*, 5 *Tinea* (s. str.), 5 *Pterophoridae*, 9 *Conchylis*, 3 *Acala*, including *A. cristana* from *Ulmus campestris*, etc.

Through the kindness of our valued correspondent, Mr. G. B. Pearson, of Pasadena, near Los Angeles, S. California, and a member of the South London Entomological Society, we have received a copy of the first number of the *South West Science Bulletin*, issued by the South West Science Association of Los Angeles, of which Dr. John Comstock, the well-known Lepidopterist and Assistant Director of the Los Angeles Museum, is one of the foremost members. The matter is about equally divided between Entomology (Lep.) and Botany. It contains one plate of nine coloured figures of rare and new Argynnis to illustrate Professor Comstock's articles. *Argynnis malcolmi* sp. nov. is near *A. montivaga*; race *tehachapina* v. nov. is a high mountain form of *A. montivaga*; *Melitaea salina*, Wright, of which hitherto only the type (a wreck) existed and of which Dr. Comstock had received a number from the Chiricahua Mountains in Arizona, are the species illustrated and described.

We regret to hear that Mr. H. Rowland-Brown, who so recently took up the Secretaryship of The Entomological Society, is seriously ill.

SOCIETIES.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

November 3rd, 1920.—ELECTION OF FELLOWS.—Messrs. Thomas Alexander Barns, F.Z.S., 32, Windsor Court, Bayswater, London, W.; George Bethell, F.R.Hist.S., 11, Chandos St., London, W. 1; Major

John Errol Moritz Boyd, M.C., R.A.M.C., Pendavy, Birchington-on-Sea; Miss Mary Frances Cossart Bridson, Ford Brow, Dartmouth; Messrs. Thomas Cockcroft, 111, Owen St., Wellington South, New Zealand; Ernest Crabbe, 52, Sarsfeld Road, Balham, S.W.12; J. W. Griffin, 27, The Summit, Liscard, Wallasey; Alistair Claverling Hardy, 40, Harlow Moor Drive, Harrogate; Valentine Knight, Assistant Director Raffles Museum, Singapore; Russell James, 7, Broadlands Road, Highgate, N.6; George Lodge, Hawkhouse, Camberley; Hugh Kenneth Munro, B.Sc., 258, Bourke St., Pretoria, S. Africa; John Golding Myers, Aramoho, Wanganui, New Zealand; Alfred Philpott, Assistant Entomologist, Biological Dept., Cawthron Inst. of Scientific Research, Nelson, New Zealand; Arthur Walter Richardson, 28, Avenue Road, Southall, Middlesex; Dr. Winstan St. Andrew St. John, M.R.C.S., L.R.C.P., Derwent House, Derby; Dr. John W. Scharff, M.B., D.P.M., Tampin, Federated Malay States; Messrs. Joseph Tinsley, West of Scotland Agricultural College, Burns Avenue, Kilmarnock; and William Wallace, M.B., 15, Hainton Avenue, Grimsby, were elected Fellows of the Society.

NEW BUTTERFLIES FROM DUTCH NEW GUINEA.—Mr. G. Talbot exhibited on behalf of Mr. J. J. Joicey a number of New Butterflies from the Weyland Mountains, Dutch New Guinea.

The specimens shown formed part of the first collection made by the three brothers C., F., and J. Pratt, who were sent out by Mr. Joicey to explore a little-known part of New Guinea.

LEPIDOPTERA FROM THE COOK AND SOCIETY ISLANDS; INCLUDING AN ANALYSIS OF THE MARKINGS OF THE FEMALES OF *HYPOLIMNAS BOLINA*, L.—Professor Poulton exhibited specimens illustrating the following extracts from letters received from Mr. H. W. Simmonds of the Department of Agriculture, Suva, Fiji:—

The five females sent by Mr. Simmonds from Rarotonga showed great variation. The chief differences were described below, omitting the central marking of the hindwing which was treated separately at the end.

(1) This specimen was male-like and, except for its much greater size, nearly resembled the Tahitian female.

(2) Smaller—the only one of the five which, in this respect, did not contrast with the Tahitian specimen —, darker, the white forewing bar overspread with scattered dark scales, the series of white spots parallel with the hind margin slightly developed, as also the orange ochreous marginal and submarginal lines in both wings, tending to invade the apical area of forewing.

(3) In this specimen the series of white spots, present on both wings, was more developed, as also the orange ochreous markings, especially at the apex of forewing.

(4) Similar, except for the still greater development and richer shade of the orange ochreous and the slightly less developed series of white spots.

(5) The white forewing bar overspread as in (2); the ochreous markings very pale, nearly white in the apical area. In the hindwing the pale ochreous submarginal marking was no longer a line but a band much broader than in any other of these five females. The President, however, had captured specimens in Rarotonga with a far

greater development of ochreous, recalling some of the Fiji females of *bolina*.

EAST AFRICAN DANAINÉ BUTTERFLIES RESTING, CROWDED IN A BAMBOO CLUMP, DURING THE HOT HOURS OF THE DAY.—Prof. Poulton said that he had received only that morning a letter from one of their Fellows—Mr. C. F. M. Swynnerton, Game Warden of the Tanganyika Territory; and he wished to call the attention of the meeting to the interesting observations recorded by the writer.

ABERRATIONS OF *BRENTHIS EUPHROSYNÉ* AND *B. SELENE*.—The Secretary exhibited on behalf of Mr. B. G. Adams a magnificent collection of aberrations of *B. euphrosyne* and *B. selene*, all taken in different years in a restricted locality in N. Devon about 600 ft. above the sea. Amongst these were two specimens which appeared to be hybrids, the upperside of one being that of *B. euphrosyne* with the underside of *B. selene*, the opposite being the case with the other specimen. The two species often overlapped.

DIPTERA FROM NORFOLK.—Mr. J. E. Collin exhibited the following interesting species of Diptera captured on Blakeney Point, Norfolk, from July 16th-24th, 1920.

Hercostomus praetextatus, Haliday. Described in 1855 from a single male captured in July, 1854, on the Sandhills of Rossbegh Point, (Kerry), and never rediscovered in Britain until Dr. Winifred E. Brenchley found two females at Blakeney Point in August, 1919, a discovery which led to the search for and capture of both sexes in some numbers this year.

Pipunculus minimus, Becker. A species new to the British List not hitherto considered distinct from *P. littoralis*, Becker.

Limnophora aestuum, Villeneuve. Also new to the British List. Mr. H. W. Andrews has found this species in Ireland, and there were one or two unidentified specimens in the Verrall Collection. It was a common species among the *Psamma* growing on the sandhills at Blakeney.

Limnophora maritima v. Röder. This name so far as the British List is concerned has been wrongly applied to the next species. The females were common on the sandy mud left exposed by the retreating tide, but only three males were captured.

Limnophora virgo, Villeneuve. Only a single female of this interesting species was captured among the *Psamma* growing on the sandhills. The name is new to the "List," though previous British records of *L. maritima* apply to this species.

Limnophora biseriata, Stein. A recently (1916) described species which was fairly common on the *Psamma*-covered sandhills. It is an addition to the British List.

Tetanops myopina, Fallen. A sea-coast and sand-hill Ortalid not often found in collections and the only representative of the genus in Britain.

PAPERS.—The following papers were read:—"Butterfly Migration in British Guiana," by L. D. Cleare, F.E.S. "Preliminary Note on the Interpretation of Insectan and Myriopodan Structures, through a Comparison with the Structures of Crustacea," by Prof. G. C. Crampton, Ph.D., F.E.S.

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LEONARD TATCHELL, Lepidopterist, 43, Spratt Hall Road, Wanstead, E.11.

Duplicates.—Varleyata and other varieties of Grossulariata. *Desiderata.*—Good varieties and local forms. *Spilosoma urticae*, *Advenaria*, and other ordinary species to renew old series. Good Tortrices and Tineae.—Geo. T. Porritt, Elm Lea, Dalton, Huddersfield.

Desiderata.—*Cratagata*, *Sambucaria*, condition immateria.. *Duplicates.*—*Dominula mendica*, and numerous common species.—E. A. Cockayne, 65, Westbourne Terrace, W.2.

Desiderata.—Foreign examples, local races, vars. and abs. from all parts of the world of any butterflies included in the British list. Setting immaterial; exact data indispensable. Liberal return made.—W. G. Pether, "Thelma," 4, Willow Bridge Road, London, N. 1.

Duplicates.—*Æthiophe*, *Selene*, *T. rubi*, *Phlæas*, *Hectus*, *Perla*, *Chi*, *Nictitans*, *Boreata*, *Cambrica*, *Immanata*, *Olivata*, *Tristata*, *Dotata*, *Pedaria*, *Satyrata*, *Adæquata*, *Mercurella*, *Angustea*, *Dubitalis*, *Ambigualis*, *Decrepitalis*, *Kuehniella*, *Fusca*, *Margari-tellus*, *Phryganella*, *Solandriana*, *Sponsona*, *Rivulana*, *Urticana*, *Aurana*, *Dubitana*, *Herbosana*, *Myllerana*, *Octomaculana*, *Vaccinana*, and *Perlepidana*. *Desiderata.*—Numerous, especially Tortricina.—A. A. Dalglish, 7, Keir Street, Pollokshields, Glasgow.

Duplicates.—*Aglaia*, *Adippe*, **Io*, *T. quercus*, *Coridon* vars., **Fuliginosa* (Reading), **B. quercus* ♀, *Tiliæ*, *Menthastri*, **Linariata*, *Aurantia*, *Leucophæaria* vars. *Paniscus*. *Desiderata.*—Pupæ of *Dictæoides*; Imagines of typhon, palpina, camelina (dark), *Curtula*, *Pyra*, and numerous others; Ova of *Hispidia*.—Harold B. Williams, 112a, Bensham Manor Road, Thornton Heath, Surrey.

Duplicates.—*Sybilla*, *Paphia*, *Io* (2), *Selene*, *Lucina* (2), *Ocellatus*, *Illustraria* (autumn) *Nastata*, *Robotaria* ♂, *Prunaria* (4) ♂, *Tipuliformis*. *Desiderata.*—*Castreusis* ♂, *Cucullina*, *Cribrum*, *Cinerea*, *Ravida*, *Ashworthii*, *Notata*, *Obfuscaria*, *Smaragdaria* and others, also vars. and local forms.—Harold E. Winsor, Kent House, Cranleigh.

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Journal of Variation

EDITED BY

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A few days at Digne.

By G. T. BETHUNE-BAKER, F.L.S., F.Z.S., F.E.S.

(With two plates.)

Continuing the record of our last year's summer holiday July 31st saw us back in the old familiar quarters at Digne once again, but with this difference that it was August instead of the end of June and early July, with the result that I was able to take a splendid series both of *Satyrus arethusa* and of *Erebia neoridas*. Here also as at St. Martin Vésubie the latter is a larger and handsomer species than those from the Mende Causse. At the summit of the hill there was as usual both *Papilio podalirius*, very old and worn, and *P. machaon* chasing each other wildly around the rocky apex. I took one great big female *P. machaon*, evidently just emerged, without a blemish, but the majority had seen better days; it was interesting to watch their wild flight round and round and to and fro, it did not appear to be sexual at all, but simply a very "joie de vivre" in the brilliant August sun. I have never been on the top of this hill (in summer time of course) without observing the same thing. On the same hill though lower down I took a single *Colias hyale* and a beautifully fresh and dark female *C. croceus*. *Brenthis (Argynnis) dia* was still in quite good condition and also *Melitaea didyma*, and rather to my surprise the females were very rare. Higher up on the Dourbes I got a couple of *Melitaea varia* and two *M. parthenie*, the latter past their best. A single belated *Satyrus circe*, quite perfect, fell to my net, and a nice little series of *Satyrus actaea*, mostly females. I took a single female of *Hipparchia semele* and three male *Melanargia galathea*, which are certainly much nearer the *procida* form than anything else, whilst I was fortunate in securing one fine ab. *leucomelas*. A single *Pararge maera* and a nice little series of half-a-dozen females of *Epinephele lycaon* were still on the wing and found resting places in my boxes. *Epinephele tithonus* was, of course, on the wing, and *Coenonympha dorus* was not yet over, whilst I took one typical *C. pamphilus* with a very dark underside. Among the *Lycaenidae* I took three fine *Heodes alciphron-race gordius*, one with great obsolescence of spots on the under-surface, a few *Rumicia phlaeas* var. *eleus* very darkly suffused, and one *H. dorilis*. *Polyommatus meleager* among the lavender was very worn indeed, but strange to say I took one male *P. escheri* and two quite beautiful females, this must be unusually late for this species. I also netted two *P. hylas*, which however are minute specimens but perfect, and are no doubt the result of starved larvæ. One female *P. icarus* and one *Plebeius medon (astrarche)* also fell to my lot. Both *Polyommatus coridon* and *P. thetis* were on the wing and in good condition, and I captured a number of the former, but of the latter I took four pairs, all being of normal size; not one of the males are, however, of normal colour, all are somewhat leaden in hue, whilst two of the *P. coridon* are similar, one being almost dark grey. I have examined the scales of all these and find they are all ill-developed, being very thin and curled as is generally the case with these abnormal blue specimens, the problem of this phenomenon is very interesting and needs working out badly. *Polyommatus admetus* var. *ripartii* was also yet on the wing and I was able to secure a fine series.

Turning now to the *Hesperiidae* I have but few to record, and here I must tender my best thanks to Mr. Rowland-Brown for kindly going

July, 1921.

through and naming for me all the difficult *Syrichthi*, as we used to call them—from the various places at which we stayed. I took several nice specimens of *Thymelicus acteon*. *Adopaea flava* (*thauamas*) had seen its best days, but *Augiades sylvanus* was still in good condition, whilst *Nisoniades* (*Thanaos*) *tages* was going over. Of the genus *Hesperia* my friend Rowland-Brown tells me I have taken *H. fritillum* (*cirsii*) only. In the few days we stayed here I did not look after Heterocera at all, but I took a typical *Coscinia striata* and one “Jersey tiger” moth.

An Essay on the Systematic Study of Variation in the Races of *Zygaena filipendulae*, L., and of its subspecies *stoechadis*, Brkh.

By ROGER VERITY, M.D.

(Continued from p. 114.)

Group of races which produce commonly both the five- and the six-spotted form, in which the red suffusion on underside of forewings is usually absent or reduced, when it exists, to a narrow streak on cubital nervure and which have, to a greater or lesser degree, a broad marginal band on hindwing (mostly *latiorelimbata*, more rarely *latissimelimbata*) and the beginning of other primary pattern markings:—

Race **pyrenes**. *mibi*=*dubia*, Obth. (*Ét. Lép. Comp.*, IV., pp. 538-542 (1910). and III. pl. xxviii., fig. 169-171 (1909). This race would belong to the *ochsenheimeri* group, because the hindwings only have a marginal dark band and are never broadly darkened, but it differs from the Italian ones by the frequency of five-spotted individuals and of those with no trace at all of red suffusion on the underside of forewing; these two forms are quite exceptional in the races described above. I note however that out of two males and four females collected by the Quercis on July 27th, 1919, at S. Pietro Avellana in the Molise (Neapolitan district), the two former and one of the latter are five-spotted, have no red suffusion on underside of forewings and the band of hindwings corresponds to those figured by Oberthür from Vernetles-Bains, so that there probably exist amongst the Italian races transitional to *etrusca*, some very similar to this author's from the Pyrénées-Orientales. His figure 169, with five spots and a marginal band on hindwing so broad as to reach about mid-way between the margin and the end of the cell can be taken as nymotypical of *pyrenes*, although he says fig. 171, with that band not broader than in *ochsenheimeri*, represents the commonest form; I suggest this because the former would never be found amongst the pure *ochsenheimeri* race and it thus characterises the Vernet race well, whereas the latter is quite similar to the scarce five-spotted individuals which occur in Italy even where *ochsenheimeri* is best characterised. I have proposed the new name of *pyrenes* for the Pyrénées-Orientales race, because, if I am not wrong, that of *dubia*, used by Oberthür for it, cannot stand. The name *dubia* was created by Staudinger in his *Cat. Lep. Eur.*, of 1861; no description accompanied it; it was simply placed, with a mark of interrogation before it, at the head of a paragraph consisting in quotations of a most heterogeneous lot of figures of various authors, which Staudinger evidently was at a loss about referring. The first figure quoted is *medicaginis*, Boisduval, *Mon. des*

Zyg., pl. IV., fig. 5. It seems to me that *dubia*, Stdgr., can in these circumstances only be considered a synonym of this name and in consequence of *medicaginis*, Hübner, with which Boisduval's figure agrees very tolerably (see below). Staudinger himself publishes, in the 1871 and 1901 editions of his Catalogue, the much older name of *medicaginis* as a synonym of his own name *dubia* quoting both Hübner and Boisduval. He makes things still worse by adding a very short and most indefinite description and giving in 1871 the following localities: "southern Alpine valleys, Pyrenees and ? Greece." All this is very confused. Evidently Staudinger intended to include the very dark *medicaginis* amongst the variations of his *dubia*, but in that case he should not have given the Pyrenees as one of its localities, because Oberthür informs us that no such form is ever found there. In those days there was great lack of knowledge concerning the distribution of the different forms of *stoechadis*. More correct are the new localities of "Illyria, Istria and Italy," added on in the 1901 edition of the *Catalog*, for in these regions there really exist races approaching the nymotypical one of *stoechadis* and producing dark forms. Had the name *dubia* been introduced in literature for the first time in 1871, together with the descriptions, we would have been rather puzzled to know exactly how to employ this very unfortunate name, which has lent itself to such a variety of interpretations and which has done so much mischief by satisfying collectors and authors too easily and stopping further inquiry. I think we can be thankful that an end is put to its use by the observation I have made above that it is only a synonym of *medicaginis*, Boisd. (1829). On the same grounds I propose the new name of *pyrenes* for the race of Vernet-les-Bains (Pyr.-Orient.), to which Oberthür had restricted it, but to which it could not be applied for the reasons given. To finish dealing with Hübner's and Boisduval's *medicaginis* I will remark that in the figure of the first there are six red spots on forewing (sixth very small), that the band of hindwing is so broad as nearly to reach the end of the cell and that its inner outline is rather straighter than in most individuals. Oberthür notes at p. 531 that "in Nature it is rarely so regularly parallel to the terminal margin in all its length." This I quite agree with, but I cannot follow him where he says one cannot be fully sure that Hübner's figure is referable to *stoechadis*. Staudinger seems to have had the same doubt, because he placed a mark of interrogation before the reference to this figure as a synonym of his *dubia*. I have before me the copy of Hübner's book which belonged to the Grand Dukes of Tuscany, and I find the figure in question excellent and unmistakable. I can only presume that all the copies have not been coloured as accurately and that in some the marginal band is represented by a sweep of the brush only, which makes its inner outline parallel to the outer one. Even in the figure I have here I notice that it is straighter on the left wing than on the right one. Hübner's description reads as follows: "Glossy green-black; anterior wings with six small carmine spots; posterior wings red only halfway. Habitat, Piedmont." I have seen specimens from Piedmont from which that figure might have been drawn, so exactly alike were they, and I possess Tuscan specimens which are as similar to it, although that form is certainly less frequent. Boisduval's figure better represents the usual form, in that the outline of the band is strongly sinuate on account of a deep

incision existing in the atrophied zone of the wing, where the band becomes markedly narrower. This figure only has five spots on forewing, but in the text *medicaginis* is described as usually having six, and it is then added that many individuals have five on the upper-side, but always six on underside. The hindwings are described by Boisduval as having a "very broad marginal band . . . strongly sinuate internally, besides this the nervures stand out in violet-blue." If the name *dubia*, Stdgr., is to survive, it can only be, to my mind, for this figure and description, as opposed to the slightly different figure of Hübner's *medicaginis*. Seitz's figure, especially of male *dubia*, represents it very fairly. Concerning the latter name, there is another question in which my friend Oberthür will, I hope, excuse me if I cannot follow.

Race **duponcheli**, mihi. In dealing with the races of *stoechadis*, he uses the name of *medicaginis*, Duponchel (1885), for that of the Alpes-Maritimes Department, which, I am about to mention. In so doing he quite disregards the law of priority established by the codes of nomenclature. Hübner created the name and any use made of it must be based on his original figure. Had the doubt expressed about it by Oberthür really existed, the name might have remained a *nomen nudum*, but no one else could have used it with a new description and Duponchel's race should anyhow receive a new name. Oberthür applies the name of *medicaginis*; Duponchel, particularly to the race of the "region not distant from the coast of the Alpes-Maritimes Department." Duponchel collected his specimens at Nice. Oberthür emphasises the points that six-spotted forms are quite rare, that there is usually no red suffusion on underside of forewing, and that "the hindwing is red," but "with a very characteristic mass of individuals, notably those with the hindwings invaded by the blue colouring." In Duponchel's figure 6 there are five spots and the band is less broad than in Hübner's and Boisduval's. Figure 5 is not a *transalpina*, Esp., as suggested by Oberthür; spot 4 stands well behind spot 3 and not further out, as it would if this were the case; it simply represents a small, weakly *duponcheli*, being probably one of those bred by Duponchel whilst travelling, as he narrates.

Race **montivaga**, Vrtý. (*Bull. Soc. Ent. Ital.* xlvii., p. 73 (December 16th, 1915)). In some mountain localities of Central Italy and more especially at considerable altitudes the size of *stoechadis* tends to diminish considerably and very small individuals are frequent. This diminutive form was for the first time observed at Bolognola, in the Sibillini Mts. (prov. of Macerata) at 1200m., and described by me under the name of *montivaga*. In the mountains in general and in this race more particularly there are two distinct emergences; one in July, before the "summer pause" and one at the end of August and in September. The latter is usually called a second generation, but this is certainly a mistake and, as observed by Querci in his paper on *Zygæna transalpina*, it consists in sluggish individuals, which are so late in rousing from their winter slumber and in feeding up that they are struck by the inhibiting effects of the height of summer before reaching their complete development and they only resume their activity again after the rains which break up the heat and allow the herbaceous vegetation to grow. In the plains the second emergence does not exist or it consists in a few sporadic individuals, but in the mountains it is in some years quite abundant, presumably when pro-

tracted cold weather impedes the growth of the larvæ till late in the season. The second emergence always consists, on the whole, of much smaller individuals than the first. In my typical series from Bolognola most males of the first reach 33mm. in expanse and a few females reach 38, but the usual size is 35 to 37 in this sex and as many as 18% of the males only measure 28mm. and 15% of the females measure 30mm.; they correspond also by their weakly build and pale colouring to race *paulula* of subspecies *filipendulae*. The second emergence entirely consists of individuals of this size and aspect and some males shrink to 26mm. and females to 29. It is noteworthy that all the small individuals belong to the *ochsenheimeri* six-spotted and narrow-margined form. At Bolognola 60% of the males and nearly all the females have six spots, as shown by the statistical table. It will also be seen by it that more than half the specimens have a broader marginal band than *microochsenheimeri*, but, at Bolognola, only quite exceptionally as broad as in *medicaginis*, Hb. Instead, on the northern slope of Monte Morello, near Florence, at Fontebuona di Vaglia, where Lepidoptera often have a high-mountain look, although the altitude is only 400m., a race similar in size to *montivaga*, but distinctly darker, has been found. Here 20% of the males and even a few females have the hindwings darkened as in *medicaginis* and the six-spotted form is reduced to 30% of the males and 60% of the females. This is evidently due to the fact that we are within the limits of the zone of high melanism of northern Tuscany. I think the designation which suits this race is that of:

Race **montivaga** trans. ad **medicaginis**, mihi.

Race **etrusca**, mihi. Duponchel states that the race from Nice he calls *medicaginis* is also found in Tuscany. Oberthür in his paragraph on *stoechadis* and *medicaginis* says the same thing, but in this case he does not distinguish these two races definitely. I think I now possess a sufficient number of series from various localities in this region to show there exist several distinct races, ranging from the one of the plains, which is the reddest, to the very dark mountain *aterrima*, through *montivaga* first and then through two grades more or less identical to *medicaginis*, Hb., and *stoechadis*, Brk., of Piedmont. The one of the plains is certainly parallel to *duponcheli* and to *pyrenes* of France: it is a first step from *ochsenheimeri* towards darker races, just like these two are a first step from *major*, Esp., to the same. Both Querci and I, however, have been struck by its peculiar brilliancy, which distinguishes it from any other race and calls for a distinctive name. I propose that of *etrusca*, taking as "typical" my series from the Pian di Mugnone, near Florence, collected in the locality so charmingly described by Oberthür in his *Études*, iv., p. 597 (m. 119-274). The dark pattern is remarkably greener than is usual in this species and the red is of a very clear and bright carmine. These tints are evidently produced by the dryness and blazing heat of that locality. In size it is distinctly large, like *ochsenheimeri*. The five-spotted form, instead of being only a great rarity found in the male sex, as in the latter, is found in about 60% of the males and 20% of the females. This distinctly places it outside the group of six-spotted races. It will be seen in the statistical table at the end of this paper that also the extent of dark markings on hindwing separates it completely from *ochsenheimeri*; only 20% of the males and 5% of the females resemble respectively its sexes, and even these individuals

are more like those of *ochsenheimeri* with comparatively broad marginal band than like the average; 50% of the males and 75% of the females exhibit the broad band, characteristic also of *duponcheli* and *pyrenes*, and the remaining 30% and 20% of the sexes have the very broad band characteristic of the next group of races. For the present I have only seen series of *etrusca* sufficiently extensive to make sure of the race from the neighbourhood of Florence, but specimens from Siena suggest the same one and it presumably extends to all the lower localities of the hinterland. Southwardly it must somewhere transform itself into the *ochsenheimeri* or *campaniae* of the Roman Campania, but the Lepidoptera of the south of Tuscany are not known. Towards the west, along the coast, the moisture of the sea-air, which produces darker races in most Lepidoptera, also influences *stoechadis*, and one finds a race evidently pointing to the Ligurian *gigantea*, Rocci. I have collected it at Antignano, near Leghorn, and during many years in the pine woods of the Forte dei Marmi, near Viareggio. It is one of the intermediate races to which I should give a special name, because it has constant features and it does not produce individuals identical with kindred races:—

Race **oraria**, mihi. By its large size and heavy build, particularly noticeable in the female, it is intermediate between *etrusca* and *gigantea*; the tinge of dark markings approaches the latter by its blackish indigo hue, deep and dull; it thus differs strikingly from the blue indigo of *medicaginis* from the mountains and it also lacks their gloss; the statistical table shows that the six-spotted form is reduced to 10% of the males and 15% of the females, being much scarcer than in the mountain *medicaginis*; the extent of dark markings on hindwing approaches distinctly that of *medicaginis*, the *ochsenheimeri* narrow band not occurring in either sex and the very broad one being about as frequent as in *etrusca* in the male, but five times more so in the female, so that on the whole this sex belongs to nearly the same grade as the other and sexual dimorphism is nearly abolished in respect of this character. Forms pointing to *zonata* occur amongst the females, showing tendency to vary in the direction of *gigantea*, as will be seen later. It is interesting to note how much scarcer the six-spotted form is here, than is the case in those mountain races which have about the same grade of development of the primary pattern on hindwing. By the former character this race would belong to the following group of races; by the latter it can only stand here, being distinctly lesser than in *medicaginis*, especially in the male.

Group of races very predominantly five-spotted on forewing, with no red suffusion on underside and with very broad marginal band (*latissimelimbata*) and usually an extensive primary pattern on hindwing:—

Race **medicaginis**, Hübner (*Samml. Eur. Schmett.*, Pl. Lep. II., *Sphinges* I., fig. 20 [1796]). I have already quoted and discussed the original figure and description and said that also Boisduval's *medicaginis* corresponds to them very well, so that, to my mind, Staudinger's *dubia* is but a synonym of this name. Hübner's locality is: "Piedmont." I think there can be no doubt that the name should be applied to those races of that region in which the predominating form can be described as having the marginal band of hindwing so broad as to reach, or just fall short of reaching, the end of the cell and the

remainder of the wing red; as a rule some dark streaks exist between the cell and the dorsal margin and a dark spot exists inside the cell; individuals in which they are absent, like those figured by Hübner and Boisduval, are scarce. Collecting has not been carried on fully enough in Piedmont to determine exactly where races answering that description are to be found, but from the specimens of various localities sent to me by Signor Gianelli of Turin and from the few I have collected myself near Turin and near Acqui it would seem as if *medicaginis* was a very common and diffused form from the Alpine valleys to the hills of the Upper Po basin. Thence it is met with on the Apennine in the whole of the "zone of melanism" I have described when dealing with *stoechadis* in general and it predominates here and there. For instance, Querci and I have found on the Futa Pass road, at La Traversa and Covigliaio, m. 900, in northern Tuscany, a race which by the extent of the primary pattern corresponds to the description given above and which does not differ from Piedmontese specimens either in size or colour, being smaller than *etrusca* and of a pure bright indigo (not greenish), larger and more saturated in tinge than *montivaga*. In this series 20% of the males and 30% of the females are six-spotted. It is very likely that Illyria, Istria and Dalmatia also produce *medicaginis* in some mountain localities.

Race *stoechadis*, Borkhausen (*Rheinisches Magazin*, i., p. 628 (1793)). Those readers who might be interested in the unhappy origin of the name *stoechadis*, Borkhausen, I am obliged to refer to Oberthür's interesting historical notes in the *Études de Léop. Comp.*, iv., pp. 527-538. I must limit myself here to quoting Borkhausen's original description drawn from a figure published by Hübner in his *Beiträge zur Geschichte der Schmetterlinge*, ii., pl. III., fig. O.: "The whole of the wings of a bluish-green, superior ones with six red spots, inferior with two or three and erosion of the base red . . ." The localities given are "Languedoc and Piedmont," but the latter alone stands good, because the former is a mistake due to the fact that *Z. larandulae*, Esp., is mixed up in the description. Individual forms roughly answering this description are, of course, to be found almost anywhere in Piedmont, but the creation of the name *medicaginis* for less melanic ones has limited *stoechadis*, as the name of a race, to those localities in that region in which the majority of male individuals can be described as having the hindwings entirely darkened by the primary pattern, except a red spot at the end of the cell and some marked red rays at their base. As in *medicaginis*, the exact localities of the race answering this description cannot as yet be made out for lack of material. Probably it will, as a rule, be found more frequently at higher altitudes than *medicaginis*, and especially in the Alps. Many of the specimens collected by Gianelli at Susa, m. 500, and at the village of Valdieri, m. 750, belong to this form, but whether they predominate I do not know; so does the only individual of this species which I have ever found at the Baths of Valdieri, as high as m. 1375. With *medicaginis* this race extends along the main range of the Apennines to northern Tuscany, and it is found, generally at high altitudes, all over the "zone of melanism" in the localities where it is not replaced either by *medicaginis* or *aterrima* described in the next paragraph. I possess a series collected by the Quercis at Palazzuolo di Romagna, m. 700, which quite agrees with the race of Piedmont in every respect; another from the

Palasaccio, m. 500, near Firenzuola, collected by me on swampy ground, and a third from Mt. Sumbra, m. 1400, in the Alpi Apuane. The six-spotted form described by Borkhausen is extremely rare in the male sex, but females occur with a small sixth spot still present, although their hindwings are dark enough to answer his description.

Further south than Tuscany both *medicaginis* and *stoechadis* disappear even in the main range of the Apennines and they are replaced either by the small, pale *montivaga* or, more usually, by *microchsenheimeri*, which is their equivalent in size and colouring, but constantly six-spotted and with a comparatively much narrower marginal band on hindwing, so that from north to south there takes place in the mountains a transformation parallel to that of the plain from *etrusca* to *ochsenheimeri*.

Race **gigantea**, Rocci (*Atti Soc. Ligustica di Scienze Naturali e Geografiche*, xxiii. [1912] and xxv., p. 220 [1915]). A remarkable race is found on the coast of Liguria. Dr. Rocci of Genoa has sent me specimens collected near that town, at Quezzi, in the locality where *Z. carniolica*, Scop., produces its darkest known race *roccii*, Vrtý., and where other *Zygæna* are very dark too. Here *stoechadis*, although it flies at sea-level, is obscured as much as in the darkest races, usually found at high altitudes; the moisture of the sea-air is, no doubt, the cause. I cannot give a full account of the frequency of the various individual forms and of the average extent of the pattern, because I have not seen a sufficiently large series of specimens collected at random. Those males I have all belong to the darkest forms: *seminigrata*, *biguttata* and *guttata* (*vide infra*), but they may have been picked out. The female sex produces a peculiar form, unknown from any other locality, but not very rare at Quezzi, which Rocci has called *zonata* and which I will describe further on. What distinguishes particularly, however, this race from any other is its large size. Rocci has well called *gigantea* the largest female form of Quezzi, a true giant as compared with any other *Zygæna* of Europe. His name should be extended to the entire race, because half the males I have before me measure 37mm. in expanse, the rest 36 and rarely 34; out of the hundreds of specimens in my collection only one male of the notably large race of *ochsenheimeri* from the Aurunci Mts. reaches the former size; usually this race averages 36, race *etrusca* 34 and the more melanic races, similar in this respect to the *gigantea*, only average 32. These differences may seem trifling in figures, but when they are applied to the insects they are most conspicuous. Usually the darkest races of subspecies *stoechadis* are also the smallest and are found at high altitudes, so that *gigantea* is a striking exception in all respects. The tinge of the dark pattern is of a more blackish indigo even than in *aterrima*. The fact that *gigantea* produces ab. *parviguttata*, Rocci, otherwise only found in race *aterrima*, points to its coming very near it in the proportion of melanic forms.

Race **aterrima**, mibi. I have already stated that what can be called the centre of melanism of *stoechadis* exists in northern Tuscany, in the mountains above Lucca and Pistoia. The truly superb race found in this region goes so far beyond the nymotypical *stoechadis* of Piedmont that it must be distinguished by a name and the descriptive one of *aterrima* well suits it. In size it is about the same as *montivaga* in the female sex, averaging 35 to 37 mm., but the male is distinctly smaller than in that race on the whole (31 mm. on an average), and as

small as 27 mm., especially in the darker individuals. The latter are also very blackish in tinge and with very little gloss. The sixth red spot of forewing is only found in about 10% of the females and never in the male. Only 6% of the males and 25% of the females in my series can be described as having the hindwings red with a broad dark margin and dark rays, 10% of the first and 25% of the second as having them streaked with red and indigo in about equal proportions of the two colours. Instead, as many as 40% of the males and 10% of the females have the hindwings entirely black, with one red spot at the end of cell; the remainder are like these, but have some red rays at the base, usually very thin; in the females the spot is larger and oblong and the rays are longer and thicker. One male and one female out of about 200 specimens of this race I possess have no trace of red left on hindwing (ab. *nigrata*, Dziurz). As a rule, however, the five spots of forewing decrease in the same proportion as the single spot of hindwing, and in culminating individuals, they are all reduced to one or two dozen pinkish scales, scarcely visible to the naked eye in extreme male examples; these are small, frail, degenerate individuals, with the dark scales of a dull black tinge, but, though they are nothing but aberrations, they are produced comparatively often (roughly 1 : 100); the name of ab. *parviguttata*, Rocci (1914), can be used for them; a Tuscan specimen has been figured by Burgeff (*Mitt. Münchner Ent. Ges.*, 1914, pl. III.), under the wrong name of *nigrata*, Dz. My "typical" series is from Mount Prato Fiorito, collected from the Fegana Valley, m. 600 to the top, m. 1000, above the Bagni di Lucca. I have collected similar series at Piteglio, m. 700, above Pistoia.

We have thus examined the series of gradually darkening races of subspecies *stoechadis* from *siciliensis* and *calabra* to *aterrima*.

According to their average size and following the same order they fall as follows in very natural groups and in successive grades in each of these:

Very small: *montivaga*, *aterrima*.

Small: *microchsenheimeri*; *medicaginis*; *stoechadis*.

Large: *siciliensis*; *calabra*; *major* and *ochsenheimeri*; *pyrenes*; *duponcheli* and *etrusca*; *oraria*.

Very large: *gigantea*.

I have of course only mentioned the standard races, which have been named. It must however, be noted that, owing to the considerable individual variation, especially in the darker races, we are obliged to include, in each of these, series from various localities not exactly similar to each other. It would, on the other hand, be quite unpractical to multiply names on the ground of purely statistical data. To define and convey more accurately the aspect of the various series, which may be collected in different localities, I think the clearest and most practical way is to establish and name a certain number of grades in the line of individual variation, and to indicate the number of individuals which can be grouped in each of these. I will end this paper with the following attempt to apply this method.

By far the greatest amount of variation takes place on the hindwings and the general impression of greater or lesser development of the primary dark pattern depends chiefly on their aspect. We must therefore begin by working out these markings.

(To be concluded.)

Coccinella 7-punctata, L., ab. divaricata, Oliv. Ent. I. vi. pp. 1001, 1002, No. 21 [1808].

By G. B. C. LEMAN, F.E.S.

On February 7th, 1921, Mr. H. St. J. Donisthorpe showed me a specimen of an aberration of *C. 7-punctata*, L., given to him by Capt. R. Troup, who took it in October, 1918, at Taverham Camp, about 5 miles north of Norwich. In sending Mr. Donisthorpe this aberration, Capt. Troup furnished the following data as to its capture:—

"The 7-spot ab. was taken on a head of barley growing in a field next our men's lines at Taverham Camp, about 5 miles north of Norwich. There were numerous other quite ordinary specimens along the edge of the field but this was the only aberration I have ever seen of this species. I unfortunately made no note of the date at the time as I was too much engaged in my military duties to trouble much about Coleoptera. . . . I am sorry it is not more perfectly set, but I kept the insect all the winter in the hopes of breeding from it in the spring. Although I introduced several ordinary 7-spots, and fed them on blight, which they all ate voraciously, the ab. died in February, and this mishap was not discovered for several days."

This aberration proves to be ab. *divaricata*, Olivier, who described it as follows:—

"21. Coccinelle divariquée, *Coccinella divaricata*, pl. 5, fig. 67.

"C. noir : élytres rouges avec deux raies sinuées, divariquées, et un point noir.

"*C. nigra*, elytris rubris vittis duabus sinuatis divaricatis punctoque distincto, nigris.

"Magnitudo et statura *C. septempunctatae*. Antennæ rufæ. Caput nigrum punctis duobus albis. Thorax niger, macula in angulo anteriori alba. Scutellum nigrum. Elytra rubra, in singulo vitta abbreviata, sinuata, obliqua, punctoque quadrangulari versus marginem, nigris. Corpus nigrum.

"Elle est de la grandeur de la *C. sept-points*. Les Antennes sont fauves. La tête est noir avec deux points blancs. Le corcelet est noir, avec une tache blanche, de chaque côte, à l'angle antérieur. L'écusson est noir. Les élytres sont rouges, marquées chacune d'une raie noire, sinuée, oblique, courte, et d'un point, vers le bord extérieur, en losange, pareillement noir. La raie paroit formée de trois taches presque carrées, reunies par un de leur angles. Le dessous du corps est noir.

"Je l'ai trouvé sur des arbres, dans l'île de Naxos."

Olivier gives a good coloured figure of his Coccinellid, but it may perhaps be noted that this figure shows the existence on each elytron of a small round red spot in the general upper confluence below the $\frac{1}{2}$ spot, near the suture and in a parallel line with the isolated diamond-shaped marginal spot (no. 1), though Olivier makes no reference in his text to these two small red spots.

Capt. Troup's specimen, however, corresponds with Olivier's figure 67 in having these two small red spots.

I may add that in the general collection at the S. Kensington Museum there are two specimens labelled "*C. divaricata*," recorded as taken at "Bootan" and "Bertan, N. India, Capt. Pemberton," in which these two red spots are absent.

For localities for this aberration Mulsant, Spec. p. 112, no. 21 (1850), gives:—

"Patrie: l'île de Naxos (Olivier, Col. Chevr., type), le Grèce continentale (Latreille, Coll. Dejean); l'orient, le Bengale (Hope, Perroud, Westermann, etc.)."

I have found no other record nearer than Greece for this aberration.

Observations on the Family Coleophorides.—Descent and Ovum.

By ALFRED SICH, F.E.S.

Perhaps among the Palæarctic Tineina no group of species offers to the student a wider and more interesting field of observation than the extensive and apparently indivisible genus *Coleophora*. Very little of this field has yet been surveyed. Something is known of the imagines of this genus, less of the larvæ and their complete cases, comparatively nothing of the pupæ, the early larval stages, and the ova. Dr. Chapman and the late Mr. Tutt, in their phylogenetic tree, have placed the Coleophorides in the Geometro-Eriocraniid stirps, making them with other families branch off the main stem above the Adelides. This bough soon throws off the Tineides, and later divides into two branches, one carrying the Lithocolletides and the Gracilariides, the other, which rises higher, bears the Coleophorides only (Tutt, *Brit. Lep.*, vol. i., pl. i.). Dr. Chapman further points out that the Coleophorids are derived from the Adelids, the presence of the large dorsal head plate, and the narrowness of the prothoracic plate in the pupa, are other characters indicating such an origin, while the ovipositor of some species, though not formed for cutting but for searching for a nidus for the egg, resembles that of Adelids (Chapman, *Trans. Ent. Soc. Lond.*, 1896). Both are case bearers in the larval stage, and though the Adelid has been content with a flat case, while the other has adopted a more or less cylindrical habitation, the initial formation of many Coleophorid cases shows simply a flat case composed of two pieces of mined leaf laid one on the other like the first Adelid case. The crotchets on the larval prolegs are arranged in two rows, resembling those of *Incurvaria*. The loss of prolegs on the sixth abdominal segment, which occurs in many Coleophorid larvæ, seems to point back to ancestors common to them and to *Gracilaria*. The obtect pupa of *Coleophora*, Dr. Chapman states, has only the fifth and sixth abdominal segments free in both sexes, and so has gone up higher than *Gracilaria*, whose pupa still retains the freedom of the seventh segment in the male, and comes partly out of the cocoon on the emergence of the imago. I have briefly mentioned these particulars because in the study of a family some conception of its origin affords one of the foundation stones on which to build, and is also very helpful in the interpretation of the characteristics and habits of its members. There is one south European member of the Adelides, *Crinopteryx familiella*, whose larval habits are too interesting to omit here. Dr. Chapman, who reared many specimens, observed that the larva at first mines in the leaves of *Cistus*, and after reaching the penultimate stage cuts out a case and lives exactly like a *Coleophora*, fastening its case beneath the leaf, and making a hole and a blotch precisely like a *Coleophora*" (*Ent. Mo. Mag.*, 1902, p. 94). Here we see at least a habit now obtaining in the two families, and probably we may recognise in the habit the outcome of a tendency to make this particular kind of mine in some of the early ancestors of both families.

Like most studies, that of the Coleophorids is beset with difficulties, but the paramount obstruction here lies in the woful want of knowledge of the earlier stages. The ovum is a very important item, and I doubt whether any observer knows more than a dozen eggs of this genus. The little that is known shows that there are at least four distinct types of egg. Dr. Chapman has described the ovum of *muri-nipennella* as "very soft, moulding itself readily to the position in which it is laid, pearly white, no surface sculpturing, the long axis is the micropylar one, the other two were not detected to be different. The micropylar area is a raised mamilla with apparently a scalloped margin" (*Entom.*, 1901). The eggs from which this description was made I saw laid in the flowers of *Luzula*. This I consider is not a strictly flat egg but really intermediate between the flat and the upright. When lying lengthwise it looks like a flat egg, but the two shorter axes are equal, or nearly so. The ovum of *caespititiella* appears to have made a slight advance towards the next type, as if I remember correctly it has some surface sculpturing, but I can find no description, and though I have a photograph of two kindly taken by Mr. Tonge, it does not show sufficient detail, as the eggs were in very poor condition. The two species last mentioned belong to the rush-feeding section, which is probably the most ancient in the genus. In the next type the micropylar end is truncated and the other, rather wider, is evenly rounded. The micropyle lies in a shallow basin and is encircled by a raised flange. Within the basin arise several ribs, which become very strong as they run over the rim, and they with others run down the walls of the egg and are crossed at right angles by raised lines. In this type there is a definite surface sculpture, and the moths thrust the eggs into angles, as those formed by the mid rib of a leaf with the lamina, or at the base of a leaf stalk. In the four species that I know with this type of egg the larva on hatching leaves the egg and wanders till it finds a suitable situation in which to commence its mine. The species I have found to possess ova of this kind are *fusedinella*, *hemerobiella*, *chalcogrammella*, and *discordella*.

In the third type we find, as in the ovum of *gryphipennella*, a truly upright egg. It is laid on the surface of the leaf of rose and is tall nipple shaped, about one third higher than wide, widest at the base, attenuated gradually to the rounded top where the micropyle lies. About fifteen ribs run down the walls from the apex to the base and about twenty secondary ribs encircle the egg. The ovum of *lineola* is very similar to this. It is laid also on the leaf of its food plants, and the larva mines through the base of egg shell into the leaf. I believe this habit obtains with all the species of this genus with upright eggs. It is so with *riminetella*, which lays a somewhat similar egg to the last, but it is not so tall. Very close to this is also the ovum of *bicolorella*, obtained by Mr. H. J. Turner (*Ent. Record*, vol. xxvi., pl. xxii.). Rather wider and lower is the egg of *ibipennella*, Stainton (*Proc. S.L.E.S.*, 1920, p. 70), laid on the leaf of birch, and lower still, with flatter ribs, are the two very similar ova of *juniolella* and *laricella* (Turner, *Ent. Record*, vol. xviii., p. 121, and Tutt, *Practical Hints*, part iii., pl. 2, fig. 6). The former is laid on the leaf of *Caluna*, and the larva bores through the egg shell into the leaf, while the latter is placed on a needle of *Larix*, and has probably the same larval habit. There is yet another distinct form of ovum in this genus. We find *solitariella* has

a rather tall egg, ribbed like most of those previously mentioned, and having a wide and deep hollow on the top in which the micropyle lies. It is laid on the leaf of *Stellaria holostea*. Of this upright type is also the beautiful egg of *niveicostella*, which is laid on the leaves of thyme. The shape is that of a cone, in which the upper third is inverted, forming a wide and deep basin, like a microscopical volcano and its crater, the rim of which is occupied by about fifteen large blunt teeth. The walls are ornamented by a double system of ribs. This larva and also that of *solitariella* eat their way through the floor of the egg shell into the tissue of the leaf without exposing themselves to the atmosphere. Mr. F. Noad Clark and Mr. Tonge have taken photographs of some of these eggs. This minute sample of the Coleophorid ova shows a surprising diversity for the same genus, or even for the same family. We see a nearly flat smooth egg, a nearly flat ribbed egg (which when laid on glass is placed lengthwise), then a low and a high nipple shaped ovum strictly upright, and finally an upright volcano shaped egg. Though the development may be traced, the difference between the first and the last is very great. For I feel sure that if the eggs only of *murinipennella* and *niveicostella* were placed before a lepidopterist he would say that they certainly could not belong to the same genus, and hardly to the same family.

Murinipennella hides its eggs in the flowers of *Luzula*, where it no doubt escapes the eyes of many enemies, and so is not so much exposed to the struggle for life as are eggs which are laid on the surface of leaves. It follows then that this egg has probably retained more ancestral character than those less well hidden. Its surroundings are probably much the same as were those of the ovum of the primitive Coleophorid. The ovum of *ornatipennella*, which I have lately found, supports this idea. The imago, very similar to our *livella*, is totally different from any of the rush-feeding group, but the egg, though larger and tougher, is otherwise quite of the *caespitiella* type. Like the eggs of this type it is well hidden, being laid deep down in the calyx of *Salvia pratensis*. When the ovum is only partly hidden, as in the angles along the ribs of leaves, we should expect some further development, and we find it in the eggs of such species as *fuscadinella*, which are distinctly sculptured, the ribs probably giving the shell extra strength. In those eggs which lie fully exposed on the surface of leaves we should look for the highest development of which the genus is capable. Among these we find the tall ovum of *gryphipennella* and the orange egg of *niveicostella*, which reminds the observer of one of those brightly coloured species of microscopical fungi that frequently attack the leaves of plants. What other forms the ovum may take in this family subsequent research may reveal, for it can hardly be expected that the sixteen eggs here mentioned exhibit all the forms existing in a family containing some hundreds of known species.

(To be continued.)

Notes from La Sainte Baume.

By G. H. GURNEY, F.Z.S., F.E.S., etc.

I have just been reading in the current number of the *Ent. Record* Mr. Bethune-Baker's very interesting account of his captures last July at La Sainte Baume. I was there at the same time, and took one or two species which he does not mention as having seen and which it

may be worth while to record. I found *Laeosopis roboris* common in one or two restricted spots, and was able to take a good series (July 3rd), though it is a butterfly that very quickly gets past its best, and I had to release half those I captured as they were too worn to be worth keeping. The late Rev. F. Lowe considered that this species feeds on oak in this district, and I agree with him as I could see no sign of any ash. Just before the road descends to Nans I took two female *Brenthis hecate*, but this species was evidently over, as these two individuals were very worn.

Another species which Mr. Bethune-Baker does not mention is *Chattendenia (Thecla) w-album*, which was taken behind the Hôtellerie, a few only, but they were quite fresh. Nearer the woods I picked up one or two newly emerged *Brenthis daphne*, feeding on the bramble flowers.

Chrysophanus alciphron var. *gordius* was another species which was only represented by one or two examples, but I do not think it was over as those I did see were fresh, but it is probably rare at La Sainte Baume, and they were a small form.

On July 9th *Bithys (Zephyrus) quercus* occurred in profusion along the Nans road, all very fine large examples, many of them being considerably bigger than my largest specimens from Digne. At midday they were not flying, but sitting quietly on the leaves of the maple trees and evergreen oaks which bordered the road, from which they could be shaken in scores.

At Nans, on July 11th to 14th, fresh broods of *Melitaea didyma* and *M. deione* were common, with many larvæ of the latter on a species of *Linaria*; some of these I collected, and they emerged as fine examples when I got home. *Satyrus fidia* was not uncommon and fresh *Polygonia (Grapta) eyea* occurred both at Nans, with fine *Agriades thetis (bellargus)*, also odd specimens of *Pyrus sao* and *Nisoniades tages*, which were rare higher up at La Sainte Baume, though I took examples of each species on the rough stony ground outside the Hôtellerie. My other Hesperids were the same as Mr. Bethune-Baker mentions. Great quantities of beautifully fresh *Papilio podalirius* were a feature at Nans on July 12th, with many full-fed larvæ on small cherry trees; while in clearings in the woods, visiting a tall yellow flowering thistle, the beautiful Sphingid *Phryxus livornica*, was not infrequent. By July 14th the plains round Nans were completely burnt up, and insects became scarce and very localized, retiring to spots where they could get a little shade and moisture; *Polyommatus dolus* was however still quite fresh and very common, all round Nans, at this date.

SOCIETIES.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

November 17th, 1920.—In reading the minutes of the previous meeting, the Hon. Secretary observed that it was now known that M. Semenoff Thian-Shanski was still living.

ELECTION OF FELLOWS.—Messrs. T. H. L. Grosvenor, Waldeanes, Redhill; Edgar E. Syms, 22, Woodlands Avenue, Wanstead, E. 11; and Cyril Luckes Withycombe, 12, Prospect Hill, Walthamstow, were elected Fellows of the Society.

THE NEW HOUSE.—The Treasurer reported that the contract for 41, Queen's Gate, was now signed, and announced the munificent donation of £1000 by Dr. Longstaff towards the purchase.

FURTHER INSTANCES OF THE MIMETIC ASSOCIATION BETWEEN TWO EUPLOEINES AND ONE DANAINA IN FIJI.—Prof. Poulton said that he had received from Mr. F. W. Simmonds many more examples of the species tabulated in *Proc. Ent. Soc.*, 1919, pp. lxi.-lxxi. Although several other Euploeas were recorded from Fiji it was obvious from Mr. Simmonds' captures that *Nipara eleutho*, Quoy, and its mimic *Deragena proserpina*, Butl., were the dominant forms, and that next in abundance among the *Danainae*, was *Tirumala neptunia*, Feld., which flew with and mimicked the far commoner Euploeas. It was shewn in the previous communication (p. lxxi.) that the female *proserpina* was a better mimic of *eleutho* than the male; and the series of *neptunia* now received proved that here too the female Danaine resembled the Euploeas more closely than the male, the suppression of the greenish markings in the central and basal parts of both wings being carried much further in most examples of the former sex than in most of the latter.

NEW LEPIDOPTERA FROM THE ISLAND OF HAINAN.—Mr. G. Talbot, on behalf of Mr. J. J. Joicey, exhibited numerous specimens of new Lepidoptera from the island of Hainan.

A CURIOUS COCOON.—Dr. Marshall exhibited a curious flattened cocoon from S. Italy and the larva which had been extracted from it, which superficially resembled a Hesperiid. In answer to his enquiry the Rev. F. D. Morice stated that they were the larva and cocoon of a saw-fly nearly related to *Cimbex*.

MELANIC NOLIDAE.—Dr. Cockayne exhibited a series of *Nola cucullatella*, var. *fuliginalis*, Steph., bred in June and July, 1920, from Epping Forest larvæ, together with type specimens from the same locality, including the seven darkest. The percentage of melanic specimens was 10%, 34 having been bred out of a total of 339. He had bred 57 specimens of the hymenopterous parasite *Meteorus fragilis*, Wesm., from this species. He also exhibited a pair of *N. confusalis* type and a pair of var. *columbaria*, Image, from the same locality to show the parallel melanic variation.

NEW LEPIDOPTERA FROM MADAGASCAR.—Mons. F. Le Cerf exhibited the following specimens: (1) a new species of *Lymantria*, with flesh-coloured hindwings washed with black and grey; (2) a pair of a new and very large species of *Dasychira*, with black and white upper- and yellow under-wings, another pair of which are in Mr. Joicey's collection; (3) a new species of *Pinacopteryx* belonging to the *simana*, Hoff., group, but quite without black markings except at the apex; and (4) a male *Hypolimnas bolina*, L., from the interior of the island, east of Manajany, with strongly marked discoidal patches and submarginal spots.

PROBABLE HETEROMORPHISM OF SECONDARY SEXUAL CHARACTERS IN TRILOCHANA.—Mons. Le Cerf also made observations on a probable case of heteromorphism in *Aegeriidae* which he had discovered in Mr. Joicey's collection.

February 2nd, 1921.—The President announced that he had nominated the following Fellows to be Vice-Presidents for the ensuing

year:—Mr. G. T. Bethune-Baker, Mr. J. Hartley Durrant, and Commander J. J. Walker, R.N. He also announced that three Committees, Finance, Publications, and Library, had been formed in place of the Business Committee, and the names of the Fellows appointed to serve thereon respectively.

BREEDING OF *C. HIRUNDINIS*.—Mr. A. Bacot exhibited living specimens of *Cimex hirundinis*, and gave an account of his breeding experiments therewith.

STRIDULATION IN SATURNIDS.—Dr. K. Jordan exhibited samples of the Saturnian genera *Holocera*, *Ludia*, and *Orthogonioptilum*, and demonstrated the presence of a kind of stridulating organ, absent in the male; also two species of *Graphipterus*, Gr., *G. rotundatus*, Klug, and *G. pelletieri*, Castln., from Algeria, both provided with stridulating organs. He said that the latter was found in association with *Cicindela touquii*, Guer., and that although the difference was apparent in the cabinet, in nature they were practically indistinguishable. Dr. C. J. Gahan remarked on the great interest in the discovery of these organs in the female *Henucha*; the only other instance known to him being that of *Phonaphale*, a genus of beetles of the family *Bostrichidae*.

A RARE LOCUST.—Mr. O. E. Janson exhibited a fine specimen of *Markia hyatix*, Westw., a rare and remarkable locust from Costa Rica.

MIGRATION IN A MIMETIC ASSOCIATION.—Professor E. B. Poulton, F.R.S., a case of butterflies and mimetic moths which had been observed migrating together from one valley to another in Selangor, F.M.S., and read a letter from Mr. A. R. Anderson, the observer and captor, as to the conditions under which the exhibited specimens were taken.

HIBERNATING DIPTERA.—The Professor also exhibited examples of *Musca autumnalis*, De G., found hibernating, as in previous years at St. Helens, I.W. The numbers appeared to be greater than in any winter except that of 1914-15 (cp. *Proc. Ent. Soc.*, 1915, p. 21).

HABITS OF ANTS.—Mr. Donisthorpe brought for exhibition a number of workers of *Acanthomyops (Dendrolasius) fuliginosus*, all of which had workers of *A. umbratus* fastened by their mandibles on to their legs, etc., taken at Woking in August, 1915, when a fierce battle was in progress between the two species. It served a good opportunity to establish how soon the Myrmecophils entered the new nest, and those observed in the five ensuing years were also exhibited.

BREEDING OF *C. DISPAR* RACE *RUTILUS*.—Mr. Lachlan Gibb showed several forms of the female of *Chrysophanus dispar* race *rutilus*, bred by Capt. Bagwell Purefoy. After eight years experimental breeding in this country, it was found that the blue sheen on the undersides of the species approximated more generally to that of the extinct form, but the broad orange band on the underside showed a tendency to diminish.

PAPERS.—The following papers were read: "Notes on the Orthoptera in the British Museum. The group of *Euprepocnemini*," by Dr. B. P. Uvarov. "Notes on Synonymy and on some types of oriental *Carabidae* in various foreign Collections," by Mr. Andrewes.

March 2nd.—This being the first meeting held at the Society's new premises, 41, Queen's Gate, South Kensington, S.W., the President, the Rt. Hon. Lord Rothschild, F.R.S., delivered an address of welcome to the large number of Fellows and visitors present.

ELECTION OF FELLOW.—Mr. F. C. Willett, of Sipetong, N.B. Borneo, was elected a Fellow of the Society.

GYNANDROMORPHS.—The President exhibited a collection of gynandromorphous Lepidoptera including examples of *Orgyia antiqua*, *Sciapteron dispar*, Stgr., and *Papilio (Troides) haliphron*, also examples of British caught *Colias croceus (edusa)* one having *helice* forewings and normal hindwings ♂; the other the right side *helice*, the left, normal; and right side ♂, left ♀ form of *Euchlœe cardamines* from Epping Forest.

COLOUR ADJUSTMENT OF PUPA, AND BIRD ATTACKING DRAGONFLY.—Professor Poulton brought for exhibition an example of marked irregularity in the colour adjustment of a *Pieris rapa* pupa to its surroundings; also, the wings of the dragonfly *Aeschna grandis* left by a sparrow which had attacked the dragonfly, and eaten the body.

VARIATION IN ANDRENA SPECIES.—In the absence of the author, Professor Poulton then read a paper by Dr. R. C. L. Perkins on "Variation in *Andrena rosea* and *Andrena trimmerana*," illustrated by a long series of examples of both species.

LYCAENIDS FROM PROVENCE.—Mr. G. T. Bethune-Baker exhibited specimens of *Lycaeninae* from Provence (France) to show the large proportion of those more or less leaden coloured taken in the summer of 1920. The scales seen under the microscope were found to be in all cases of the kind ill-developed.

VARIOUS FORMS OF ZYGAENIDS.—Mr. H. J. Turner exhibited an example of a Zygaenid sent him by Mr. Greer from Tyrone suggesting a natural hybrid between *Z. lonicera* and *Z. filipendulae*; also series of the large form of *Z. filipendulae* occurring abundantly on Box Hill, in which the sixth spot was very weak, and the first to disappear from wear, together with an example of *Z. anceps* recently described by M. Charles Oberthür from Hyères, and a short series of *Z. trifolii* race *albiana*, Obthr., from the same locality.

A. MIMETIC ASSEMBLAGE.—Mr. G. T. Talbot brought a number of specimens of *Euploea* from the Joicey collection, illustrating a supposed black and white mimetic combination in the Tenimber Islands, Fiji, and Australia; and a white banded group in the Key and Aru Islands.

THE RARE IMMIGRANT M. UNIONALIS.—Mr. Adkin exhibited an example of *Margarodes unionalis* taken at sugar near Arlington, Sussex, a native of southern countries, and probably a migrant to our shores.

A NEW BRITISH CIONUS.—Mr. H. J. Donisthorpe exhibited strings of the so-called "ground pearls," being probably a *Margarodes* sp. *M. formicarum*, Guilding from Jamaica, and two examples of a species of *Cionus* new to science, swept near Lake Windermere a few years since by the Rev. Canon Theodore Wood.

A NEW BRITISH MOSQUITO.—Mr. W. J. Pendlebury showed an unusually dark form of the Carabid beetle *Anchomenus dorsalis* taken in Brecon, and a variety of the mosquito *Theobaldia annulata*, first found in Mesopotamia, and described by Capt. Barraud, R.A.M.C.; the specimen exhibited being from Earl's Court, October 27th, 1920, and given the varietal name (in MS.) of *subochrea*, Edwards.

A COLLECTION OF P. HASTIANA.—Mr. G. Sheldon exhibited a series of 243 bred specimens of *Peronea hastiana*, L., from Sutherlandshire, Wicken Fen, the Isle of Wight, and the coast of Lancashire. The series included most of the named forms, and a number of un-named forms.

STRIDULATION IN LEPIDOPTERA.—Dr. J. Jordon exhibited *Musurgina laeta* from Madagascar, remarkable for its very strongly clavate antenna, and the development of a stridulating organ. He compared the process with that occurring in other species of *Agaristidae* and *Noctuidae*. He said that *Musurgina* recalled *Pemphigostolo*, Strand (1909), placed by the author with the *Castniidae*, but which would on re-examination probably turn out to be *Agaristid* also.

PAPERS.—The following papers were read "Notes on the Rhopalocera of the Dollman Collection," by N. D. Riley. "The Male Genitalia of *Merope tuber*, Newm. (Mecoptera)," by F. Muir.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

February 10th.—BREEDING CONTRIVANCES.—Mr. H. Main exhibited a contrivance he was trying in his breeding pots to keep the earth damp and at the same time to avoid staleness and mould.

ABERRATION OF *P. BRASSICAE*.—Mr. R. Adkin, a *Pieris brassicae* with the black apices of the forewings radiated by yellow streaks, taken at Eastbourne in August, 1920.

ABERRATION OF *S. PLUMARIA*.—Mr. Hy. Turner, a series of *Selidosema plumaria* from Ireland, C. Tyrone, including a curious streaked, melanic male which he had named ab. *intermedia-fumosa*.

A ZYGAENID HYBRID.—He also showed a *Zygaena* sent by Mr. Greer from Co. Tyrone as a captured hybrid between *Z. lonicerae* and *Z. filipendulae*, and pointed out its characteristics.

P. ICARUS AB. *CLARA*.—Mr. B. S. Williams, *Polyommatus icarus* ab. *clara* from Cornwall and Ireland.

VARIATION IN *P. ICARUS*.—Mr. H. Leeds, a very large number of undersides of female *P. icarus* showing 130 named forms worked out by Tutt's *British Lepidoptera*.

SPECIES OF XYLEBORUS EXHIBITED.—Mr. K. G. Blair, the bark-boring Scolytid beetles *Xyleborus dispar* and *X. savaseni* from Kidderminster with burrows in plum-tree, and a *Heliocoprís* sp. from Siam with its dung-ball cut to show egg-cavity.

February 24th.—NEW MEMBERS.—Mr. W. H. Bristowe, Ashford House, Cobham, Surrey, and Mr. Hy. Ruggles, 146, Southfield Road, Bedford Park, W. 4., were elected members.

LANTERN SLIDES WERE EXHIBITED AS FOLLOWS.—Mr. Dennis, details of the structure of an Oribatid mite. Mr. Bunnett, of the fish parasite *Argulus*, species of Protura, and the rasp of the field-cricket. Mr. Step, of Crustacea illustrating devices for disguise. Mr. Main, slides to show ease of manufacture and urged the advantages and utility of this method of illustration.

VARIATION IN *P. ICARUS*.—Mr. Leeds exhibited a very long series of the undersides of the male of *Polyommatus icarus* each identified as a named form from Tutt's *British Lepidoptera*.

M. LAERTES AND *T. AGRIPPINA*.—Mr. Hy. J. Turner, a bred series of *Morpho laertes* with a coloured photograph of the larvæ, and three *Thysania agrippina*, one measuring eleven inches in expanse, both species sent from Sao Paulo by Mr. Lindeman.

AN AFRICAN HEMIPTERON.—Mr. Hy. Moore, the Hemipteron *Platasys vermicellaris* from Nairobi.

WATER-BEETLE FLYING IN THE SUN.—Mr. Buckstone, specimens of the water-beetle *Helophorus aquaticus*, taken flying in the sunshine in abundance a few feet from the ground.

March 10th.—NEW MEMBERS.—Mr. J. Bates, Hornsey, and Major T. M. Cottam, Twickenham, were elected members.

A SPECIAL EXHIBITION OF THE GENUS *ZYGÆNA*.—Mr. Hy. J. Turner, many species representing the different sections of the genus, in the Palearctic Region from the British Isles to Japan and from Siberia to the Himalayas.

Mr. G. Talbot, showing the variation in *Z. ephialtes*, *Z. praxini*, *Z. carniolica* and *Z. transalpina*; and extreme confluent black and yellow forms of *Z. trifolii* and *Z. filipendulae* (British) with a specimen of the last with five wings.

Mr. A. W. Mera, British species, including a supposed six-spotted form of *Z. trifolii*.

Mr. B. W. Adkin, British species, including *Z. filipendulae* with the sixth spot more or less evanescent.

Mr. Leeds, numerous aberrations of the British species.

Mr. Tonge, British species, including *Z. filipendulae* with very inconspicuously marked sixth spot with very broad hind margin of hindwing in an Eastbourne example.

Mr. Jarrett, *Z. hippocrepidis* from N. Wales and a yellow *Z. filipendulae*.

Mr. T. H. Grosvenor, British species in long series and read notes on the variations and the rearing.

Mr. A. A. W. Buckstone, very long series of British species showing racial characters and some hybrids.

Mr. Barnett, series of British species.

ABERRATIONS OF BRITISH BUTTERFLIES.—Mr. B. S. Williams, an asymmetrical *Vanessa io*, a *Polyommatus icarus* aberration in which the *parvipuncta*, *discreta* and *icarinus* were united, and a brown suffused underside of the male of the latter species.

SEASONAL NOTES.—Notes on the season were communicated.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

January 17th, 1921.—NEW MEMBER.—Mr. Frederick Wm. Holder, 20, Hawesside St., Southport, was elected a member of the Society.

THE GENUS *TÆNIOCAMPA*.—A discussion on "The Genus *Taenio-campa*" was opened by the Rev. F. M. B. Carr, who exhibited his collection of this genus in illustration of his remarks; he also shewed photographs of the ova of the different species by Mr. A. E. Tonge, Reigate. The following members took part in the discussion and exhibited their series of the *Taeniocampidae*. Mr. S. Gordon Smith, varieties of *T. gothica*. Mr. W. A. Tyerman, *T. opima* from Wallasey, selected from a large number of his own breeding. At Eccleston Mere, where nearly all the tallows grow in the water, Dr. J. Cotton had noticed that the moths which fell into the water when the bushes were shaken had no difficulty in swimming to the bank. The President described several of the best known localities for collecting the *Taeniocampidae*, such as York, Hereford, Lakeside, etc., and remarked on the tendency of *T. miniosa* towards cannibalism when the larvæ were kept too crowded in the breeding cage. Mr. Tait also

exhibited *Asphalia diluta*, *Epunda nigra*, *Polia chi* and *Anchocelis rufina* from Lakeside, and *Polia flavicincta* bred from South Devon ova. Messrs. J. W. Griffin and A. W. Hughes contributed notes on collecting at swallow bloom.

March 21st.—NEW MEMBERS.—Mrs. O'Sullivan, 10, Cathedral Mansions, Huskisson Street, Liverpool, and Mr. W. G. Clutton, 136, Coal Clough Lane, Burnley, were elected members of the Society.

THE COMPETITION.—The feature of the evening was the competition for the Society's prizes specially offered for the encouragement of field work and observation.

A prize of five guineas for the best series of 60 males of *Hibernia defoliaria*, first engaged the attention of the judges; so good were the exhibits in this class that it was no easy matter to determine upon the most meritorious; eventually it was decided to award the prize offered for an essay upon the insect fauna of the sand hills as a second prize in this class, there being no essay entered.

The first prize of five guineas was therefore awarded to Mr. Chas. P. Rimmer for his set of the moth from Delamere Forest and Eastham Woods; the second, two guineas, was given to W. G. Clutton, of Burnley, for a collection made in the neighbourhood of that town.

There were some very beautiful forms shown by the competitors, including melanic variations from Burnley. Other exhibitors in this section were: the Rev. F. M. B. Carr (highly commended), Messrs. J. W. and G. A. Griffin and W. A. Tyerman.

A prize of five guineas were also awarded for the best six photographs of insects in their natural resting places selected to show the effect of protective resemblance. In this competition the prize went to Mr. Hugh Main of London for a very fine exhibit. These photographs were much admired, particularly the "*Bryophila perla* at rest on sandstone wall," this being an exceptionally fine example of protective resemblance. Professor R. Newstead, F.R.S., and Messrs. Crabtree and Mansbridge were the judges in the competitions.

EXHIBITS.—Other exhibits were insect preparations under the microscope by Mr. Chas. P. Rimmer and long series of early spring Lepidoptera by Mr. S. Gordon Smith; the latter included some nice vars. of *Hibernia leucophaea*, *H. marginaria*, *Nyssia hispidaria* and *N. zonaria*, further, the same member showed a fine specimen of *Acherontia atropos* captured near Chester.

March 21st.—PAPER.—Mr. H. M. Hallett, a Vice-president of the Society, sent a paper entitled "Parasitic Wasps and Bees." The author gave a review of practically all that is known of the parasitism of the Hymenoptera, but such a vast subject could not adequately be dealt with in a short paper. Sketches of the life histories of the parasitic *Ichneumonidae*, *Chalcididae*, *Proctotrypidae*, *Chrysididae* and *Aculeates* were given, difficulties of observation were touched upon and suggestions for future work advanced for the guidance of students of these interesting families.

ABERRATIONS IN BRITISH LEPIDOPTERA.—Mr. Chas. P. Rimmer exhibited a long series of *Cerastis vaccinii* to show the variation of the species at Delamere Forest. Mr. W. Mansbridge showed *Selenia tetralunaria* which had emerged in a warm room during February.

REVIEWS AND NOTICES OF BOOKS.

LEPIDOPTERA OF THE AMANUS.—EINE LEPIDOPTERENAUSBEUTE AUS DEM AMANUSGEBIRGE (ALMAN DAGH).—Von Professor HANS REBEL, Wien, 1917.

In 1914 Professor Franz Tölg assisted by a grant from the Imperial Scientific Academy of Vienna, made an entomological exploration of the Amanus Range, that spur of the Cilician Taurus which divides the Antioch Plain from the lowlands of Cilicia and terminates abruptly at the mouth of the River Orontes. A paper by Dr. Hans Rebel dated February 15th, 1917, deals with the Lepidoptera collected at a number of localities in the Amanus by Professor Tölg, who while serving in the Austro-Hungarian Army in the great war was killed by an accident less than two months after Dr. Rebel's paper had been laid before the Academy.

Professor Tölg visited a large part of the Amanus range between May 2nd and July 28th, 1914. He worked many different levels from low lying Toprak Kalé at the head of the Gulf of Alexandretta to the Dümanlı Dagh, 2,160 metres above sea level, the highest point of the Amanus.

Eight new species or forms are described by Rebel. These include a white female form of *Colias aurorina* var. *taurica* described as ab. ♀ *leucothea*, and a race of *Melitaea phoebe*, var. *amanica* n. var. described from a male taken at Kushdjula, or as I should write it Kushjular (i.e., The Fowlers), in the Cilician Taurus, and two females from the Amanus. This form is described as having a less acuminate forewing than other races, well marked black pattern and an uniform yellowish-brown ground colour. This last character is marked in specimens from Beirut and the Lebanon in my collection, but these have decidedly pointed forewings. *Orgyia tolgi* is an interesting form grouped by Professor Rebel with the *Orgyias*—but in pattern and colour somewhat resembling *Lymantria dispar*.

Sciapteron aurantiacum and *Sesia* (*Chamaesphesia*) *almana* are new "Clearwings" described each from a single ♂ specimen. The former is a large handsome species 32 mm. in expanse, the latter seems to be allied to *S. osmiaeformis* from S. Italy. A new Pyralid *Herculia almanalis* is close to *H. incarnatalis*. A new race of *Cledeobia bombycalis*, Schiff., is described as *almanica* n. subsp. *Pyrausta aeralis* has a new subspecies in *unicolor*, from the Dümanlı Dagh. This form is near v. *mauretanica*, Rebel.

Of new records for Syria I may mention *Melanargia gruni* (though Professor Rebel does not seem quite satisfied with this identification) and *Iolana* (*Lycaena*) *astraea*, the former from Yarbashi (Jarbaschi) and Marash, the latter from Yarbashi.

In a note on the faunistic character of the Amanus, Professor Rebel upholds the view that the Amanus if politically Syrian is faunistically merely an extension of the Cilician Taurus.

He bases this view on the following considerations.

A. A number of the characteristic Taurus forms occur also in the Amanus. Thus *Parnassius mnemosyne* is represented not by the Syrian form *libanotica*, Bryk, but by the same author's *sheljuzhkoii*; *Colias aurorina* by *taurica*, Rbl., not *libanotica*, Led.

B. Out of 222 species taken by Professor Tölg 32, i.e., 14% of the total, do not extend further S. than the Amanus.

Here I must disagree with even so great an authority on Near Eastern lepidopterous distribution as Professor Rebel. The first 15 of the 32 species in question are Rhopalocera. Of these certainly *Pieris krueperi*, *Melitaea arduinna*, *Brenthis daphne*, *Satyrus circe*, *S. beroë* and *S. anthelea* with *Cigaritis cilissa* have not been recorded for Syria S. of the Amanus. *M. collina*, another of the 15, is a little known species and I may be trusting wrongly to my memory or be referring to wrongly determined specimens when I say that I think that specimens from Beirut are in the British National collection in S. Kensington. I have taken something very similar to *Glaucopsyche (Lycaena) celestina* on the summit of the Dahr El Khodib Range (10,000 feet) in the N. Lebanon. *Thestor nogelii* occurs at Dlibta near Ghazir in the Lebanon. I have a specimen from there. As for the Lycenids *Plebeius sephyrus*, *Polyommatus amandus*, and *Hirsutina admetus*, which Dr. Rebel says do not go further S. than the Amanus, both Mrs. M. de la B. Nicholl and the writer have taken all three at many Lebanon and Anti-Lebanon localities. Miss Fountaine and I have both taken *L. poseidon* at the Cedars of Lebanon—my specimens were determined by Dr. Chapman—and *C. (Loweia) dorilis* is recorded from the Lebanon by Mrs. Nicholl and has been more recently taken by the writer at Ain Zahalta.

Another criticism may be made here. Is Professor Rebel right in speaking of *Satyrus syriaca* as a slightly differentiated form of *S. hermione*? I should have thought that the male genitalia as described and figured by M. Jullien, *Bull. Soc. Lep. Geneve*, i., pp. 361-365, and Plate no. 12 are sufficiently different from those of *hermione* to justify the separation of the two as specifically distinct forms. I may note here that all "*hermione*" from Constantinople and Bithynia in my collection have, when males, the conformation of *syriaca*. Dr. Rebel still describes *boeticus*, Rbr., as a race of *Carcharodus (Erynnis) altheae*. He gives *Hesperia malvoides*, Elw. & Edw., as being among the 88 Grypocera and Rhopalocera taken by Professor Tölg. The reader is entitled to ask whether this species has been determined by examination of the male genitalia for it is believed by many of us that very few lepidopterists, perhaps only Professor Reverdin of Geneva, can determine *malvoides* without such examination.

To revert to an earlier criticism Professor Rebel is probably right in describing the Amanus as faunistically a part of the Taurus, rather than of the Syrian mountain system, though one cannot accept all the arguments by which he arrives at this conclusion. For the rest Professor Tölg's work will be very useful for future explorers of the Amanus, which, since it lies for the most part within the "Confins Militaires" of French Syria, will probably be pacified one day and is already being supplied with more than one decent road. But may I urge intending explorers to beware of malaria at any point below 2000 feet above sea level. I spent two days at Alexandretta this spring and heard enough to be convinced that even the notorious Struma valley is at present run hard by the N. Syrian port as a fever centre. Still General Gouraud proposes to drain the Alexandretta marshes and when that is done the Amanus foothills will be as salubrious as those of Mount Lebanon.—P.P.G.

BRITISH ORTHOPTERA. BY W. J. LUCAS, B.A., F.E.S. (RAY SOCIETY).

—It was with a delightful feeling of anticipation that I picked up my old friend's book, for I had been waiting for it for nearly twenty years, and it was a personal pleasure to read it through three times in succession. The small scope offered by our few Orthoptera has allowed the author far more detail than would be possible in a work dealing with a more numerous order, and the mass of personal touches gives this book a human interest that is usually foreign from such a work. Few living British entomologists will be able to turn over its pages without finding some reference that brings back to them a flood of reminiscences, half forgotten, of happy collecting days in congenial company and delightful surroundings.

Besides, it is a very suggestive book. It is evident that we are in measurable distance of the attainment of a complete knowledge of a finite fauna. Although one of the so-called "neglected" orders, our Orthoptera are so few and at the same time so interesting, that there is now no excuse for our entomologists if they leave any blanks in our knowledge, and this book should give a marked stimulus to their study. It is possible that a few species may be added to our list. I myself have suggested that the earwig, *Chelidurella acanthopygia*, G  n  , may be found here; there is also the possibility of finding other West and Central European species, such as *Parapleurus alliaceus*, Germ., the two species of *Chrysocharon*, *Chorthippus dorsatus*, Zett., and *C. longicornis*, Latr.; *Tetrix kiefferi*, Sauley, if this be really a good species; *Phaneroptera falcata*, Scop., is recorded under apparently natural conditions, and its definite status should be put beyond doubt this summer. It is worth a journey to Cornwall on purpose, for it is a striking and handsome fellow. Then there are other striking species with a wide distribution which might conceivably occur, such as the Stick Insect, *Bacillus gallicus*, Charp., the common *Mantis religiosa*, L., and *Ephippigera vitium*, Serv., both of which extend to Belgium and to Normandy, though perhaps it is improbable that the sharp eyes of British entomologists should have for so many years overlooked such striking forms. But the south of Ireland remains to be explored, and in Scotland we may find some of the boreal forms, as *Podisma frigidum*, Boh., which is common in Norway; there is the possibility of turning up the rare and local *Sphingonotus cyanopterus*, Charp., which is known to occur in several widely separated localities in France, Germany, and Scandinavia. *Tetrix fuliginosus*, Zett., might be found in Scotland, and careful observation may yet turn up *Omocestus haemorrhoidalis*, Charp. and *Stauroderus vagans*, Fieb. *Myrmecophila acervorum*, Panz., may yet be revealed by our myrmecologists, and Westwood's record be verified. It is very small and excessively active. *Metrioptera saussureana*, Frey, is a west European mountain form, which I have taken in Normandy, and it might occur in our moorlands; it closely resembles *M. brachyptera*, L. Perhaps *Pachytylus danicus*, L., may settle and breed here, as it has been known to do in Belgium.

Then again, there is plenty of scope in the comparison of our British with the continental forms, in which special races may be discriminated. This is most probable in *Metrioptera albopunctata*, Goeze, which is a size smaller than most European forms, with decidedly shorter organs of flight: southern specimens are quite different in appearance. Observation should prove the truth of the late N. Adelung's contention, that *Ectobius perspicillaris*, Herbst., and *E.*

lapponicus, L., are but the meridional and boreal forms of a single plastic species, whose direct ancestor Shelford found in Baltic amber.

The author rather neglects the stridulation of the grasshoppers, one of the most charming features of orthopterology. It is a most useful, and by no means difficult, accomplishment to detect and recognise our few strident species by their note. I cannot discriminate between *Om. viridulus*, L., and *Om. rufipes*, Zett., but *St. lineatus*, Panz., *St. bicolor*, Charp, and *Ch. parallelus*, Zett., are unmistakable. I have often noted the presence of *Pholidoptera griseoaptera*, De Geer, with absolute certainty by its note alone, and it was only by its song that I ran down a colony of *Tettigonia verrucivora*, L., when that fine fellow was still regarded as one of our greatest rarities.

In one or two passages the author suggests that the frequent winglessness of Orthoptera is a primitive sign, but in my opinion it is invariably a degenerate character. Pantel recently described in great detail an undoubted *Anisolabis annulipes*, Luc., with fully developed organs of flight. In very many species there is a recognised dimorphism, the fully-winged and the hemipterous forms, just as the variation in the length of the forceps of the earwigs is really only dimorphism. I prefer not to give varietal names to these, but to refer to them as the macro- and cyclo-labious forms respectively: in some species one form, in some the other is normal, while in others again, only the macro-labious or cyclo-labious forms are known. The extension of these organs alters the appearance of the creatures so much, however, that they are often taken for quite distinct species, especially when we have colour variation and wing variation occurring at the same time.

The photographic plates are very good and interesting, but the lithographic ones are somewhat disappointing. Plate viii. for instance is far from doing justice to our Ectobiids. Plates iii. and xi. are quite good, but pl. xiii. again is rather disappointing. It is a pity that the author has not given profile views of *all* our Locustids, as this is generally more characteristic than the dorsal aspect, as is well shewn by pl. xvi. Plate xvii. is better coloured, but the brown form of *T. verrucivora* might well have been shewn, and the small figures are indistinct. As there are so many coloured plates it seems ungracious to complain, but *S. lineatus* and *G. maculatus* would have been better shewn in profile, and both of these and *G. rufus* lend themselves well to colour reproduction.

The author overlooks one or two points, such as Shelford's paper on fossil cockroaches in Baltic amber, and my own on fossil earwigs from the same origin. He omits mention of the peculiar reversal of the organs of flight in the nymphs of the saltatorial Orthoptera, and though he refers to Mouffet's *locus classicus* on cockroaches, he neglects the old author's quaint remarks on earwigs. Finally, it is a pity that neither *Phaneroptera falcata*, Scop., nor *Pachytylus danicus*, L., has been figured. A profile view of both these "reputed" British species would have helped and encouraged students.

But the whole work is a splendid contribution to the literature of our British fauna, and it will be very disappointing if it is not the direct cause of vigorous recruiting to the ranks of our few Orthopterists.—M.B.

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An Essay on the Systematic Study of Variation in the Races of *Zygaena filipendulae*, L., and of its subspecies *stoechadis*, Brkh.

By ROGER VERITY, M.D.

(Continued from p. 129.)

Analytic remarks on the patterns of hindwing.

The most difficult forms to study and classify systematically are those which lead up from *medicaginis*, as figured by Hübner and by Boisduval, to *stoechadis*, as described by Borkhausen; they include all those varied and beautifully complex ones in which the dark pattern gradually encroaches on the red of the basal part of the hindwing, the two intermingling in different proportions. To follow this process we will have to go into very minute details, but it is well worth it, because they show the exact similarity of pattern on forewings and hindwings, which might seem incredible at first sight, and they reveal to us the origin of the somewhat fixed aspect of the former, affording thus also the clue to its homology with other genera of Lepidoptera, from all of which it seems in a way to stand apart. The latter subject, however, I will have to leave for another paper.

Let us begin by noting that the pattern in question is in no way of nervural origin, as might be thought by the radiated look of some individuals. The terminal branches of the neururation are, often enough, covered by black scales, which look like capillary streaks emerging from the inner outline of the marginal band, but this scaling does not develop any further. These may very possibly be remnants of the "nervural pattern." Such, on the contrary, is not the case with the much more conspicuous streaks or rays which are to be seen at the back of the cell, between it and the dorsal margin. At a first glance they might seem situated on the anal nervures, but a closer inspection shows that they originate on the crease of the wing existing in the internervural space; the creases are so much more conspicuous than the nervures that they might easily be mistaken for them. The streaks usually also give the impression of being simply projections, very long and sharp, of the inner outline of the marginal band stretching towards or to the base of the wing. This again is wrong: they rise from centres quite distinct; the proof of it is that in some individuals the streak placed just behind the cubital nervure may be seen to be separated from the marginal band by a small red space or by a minute red spot situated near the root of the second branch of that nervure; it will be noticed that this is exactly the position of spot N. 4 of forewing, and that the spot described on hindwing is nothing else but its homologue; we thus also come to the conclusion that the streaks in question are homologous with the band of forewing which separates spot N. 2 from N. 4. Very often they blend together in a very large triangular patch, extending behind the cell, from the marginal band to the base of wing. Rocci has discovered at Genoa a form of the female in which this triangle is fully developed, reaching the base of the wing, and stands out on an otherwise completely red hindwing, except for the marginal band, not much broader than in *ochsenheimeri*; he has called it form *zonata* (l.c., 1914). I have never seen it from any other locality. As a rule the triangle only reaches a similar extent when the marginal band is

much broader and it is also accompanied by dark markings inside the cell. The latter make their first appearance as a black spot at the outer end of the anterior half of the cell, in front of the median nervure which divides it in two. A second similar spot then occurs at the back of this nervure; they next blend together and take the form of a little transverse band crossing the cell as far as the cubital nervure and leaving a red space or spot at the end of cell, between it and the marginal band, homologous to spot N. 5 of forewing. Very often the little band just described stops short of reaching the cubital nervure and leaves a thin red streak on this nervure, connecting spot 5 to the base of wing, just like the narrow streak of red suffusion visible on the underside of forewing of *ochsenheimeri*. When the dark markings become more extensive the two black spots or the band of the inside of cell, to all appearances, become very broad and extend as far as the base, filling up the entire cell. A few rare specimens (such as the male N. 7 and the females N. 101, 102 and 414 of my series of *stoechadis* in glass mounts) prove instead that here too, as at the back of cell, there is another centre from which the black pattern rises. In these specimens the band is narrow and its internal outline is sharply defined on a small red space, or on two little red spots (one on either side of median nervure); beyond these, between them and the base of cell, are to be seen two streaks of diffused dark scaling. There can be no doubt that this is a perfect reproduction, on a smaller scale, of the band between spot N. 5 and spot N. 3 in the cell of forewing, of spot 3 itself (sometimes separated into two in the case of hindwing) and of the band between this and the base of cell. The resemblance between the two pairs of wings is completed most perfectly by the fact that also spot N. 6 exists (when the marginal band is narrower in the "atrophied zone"), as a separate spot, with a narrow black band between it and 5 (males N. 323 and 350 and female N. 413 of my series). I take the two red spots on an entirely dark wing, described by Rocci in his *biguttata* form, to be spots 5 and 6, because specimens answering this description, with two little spots, one above the other, do exist, whereas I have never seen spots 4 and 5 on a wing with no basal rays; such a form would correspond to forms *sophiae*, Favre, and *aemilii*, Favre, of *Z. ephialtes*, L., where spot 4 exists on hindwing, together with 5, on account of some particular cause which also enlarges it very unusually on forewing; this fact furnishes another proof that they are perfectly homologous on fore and hindwing. [I said "spot," but talking of *ephiates*, I should have said, "space of spot," for this species stands apart from the remainder of the *Zygaena* by the total or nearly total obliteration of the "secondary pattern" (yellow or red) in the majority of its forms and races, the white ground colour remaining uncovered in all the spaces left by the primary pattern, except the two basal ones of forewing, where the secondary pattern begins to appear.] As to the "two or three" spots in Borkhausen's description of nymtotypical *stoechadis*, I think there can be little doubt that they were spots N. 4, 5 and 6, the partial confluence of the two latter probably explaining the "or."

As regards the nomenclature to be adopted for the various gradations in the extent of the pattern, I had thought at first of using the existing names, already applied above to the races, because, as a rule, each of these corresponds broadly to a grade, but I soon convinced

myself that this would only have led to carrying on the confusion existing hitherto between individual forms and races. The latter are characterised by size, structure, tinge, etc., as well as by the extent of pattern. The same name cannot be used in one sense for the entire race, including these various characters, and in another sense concerning only the pattern, or part of it, for an individual form which is found in several races. Besides, when successive grades in the development of a single character are to be designated, if we discard for several reasons the simpler method of numbering them, the names given should at least be descriptive and show the connection that exists between the forms of the series. For these reasons I propose, for instance, the following names for the increasing breadth of the marginal band of hindwing, which is such a prominent characteristic of the various races. In this, as in other characters, the female of each race keeps at least one grade back as compared to the male. This is another reason for having names independent of sex for individual forms. The names already existing have always been meant to cover both sexes from the same locality. I. **tenuissimelimbata**: only the fringes are black (not uncommon in males of subspecies *filipendulae*; in subsp. *stoechadis* exists in female only, namely in that of *calabra*, in some of *siciliensis*, and in *pulcherrimaeformis*). II. **tenuiorelimbata**: a capillary streak (the usual male form in subspecies *filipendulae*; in some females of *siciliensis*). III. **tenuelimbata**: streak bolder and better defined (usually in male *siciliensis* and in female *ochsenheimeri*). IV. **latelimbata**: a narrow, but distinct band; with sinuous inner outline at about $\frac{1}{4}$ of the distance between the border and the end of cell (the usual male *ochsenheimeri* and female *etrusca*). V. **latiorelimbata**: band broader, about $\frac{1}{3}$ or $\frac{1}{2}$ of distance mentioned above (more common male of *etrusca*, *pyrenes*, as in Oberthür's fig. 169-170, *duponcheli*, as in Duponchel's fig. 6 and in Oberthür's fig. 158 and 161, and female of *medicaginis*). VI. **latissimelimbata**: band extending over $\frac{1}{2}$ the distance to cell (in male of *medicaginis*, as figured by Hübner and by Boisduval, in many females of *stoechadis* and *aterrima* and, virtually, also in the darkest forms of both sexes, although its inner outline may not be discernible). It will be noticed that in this series of grades the difference between two successive ones becomes progressively greater as one proceeds from the first to the last. This has come about naturally, because I have established them by a comparison of the races and not artificially. The extent of individual variation within the limits of each grade is seen to increase and this is evidently the cause of the increasing difference between its averages. The other characters of hindwing which lack a name are the spots inside the cell and the internervural rays described above. They only appear when the marginal band has reached grade V., they become more and more constant and extensive as that band gets broader and in grade VI. they are only absent in very rare exceptions, such as, curiously enough, Hübner and Boisduval happen to have figured. When there is only one spot at the further end of the anterior half of cell I should name the form **macula**, employing the qualificative ablative (= "of the spot" or "with the spot"), to have as short a name as possible to combine with others, when necessary. When there is a second spot in the posterior half of cell I should call the form **bimacula** and when they blend into a large one, over the median

Statistical Table of leading individual variations in

Extent of primary pattern on hindwing.				Number of spots on forewing above.	<i>siciliensis</i> ♂	Mt. Cuccio ♀	<i>calabra</i> ♂	Carmelia ♀	<i>microschenh.</i> ♂	Villatina ♀	
Comparative Grade.	Breadth of marginal band (limbus)										
<i>radii</i>	<i>macula</i>	<i>limbus</i>									
R ₀	M ₀	L ₁	<i>tenuissimelimbata</i>	..	..	6	13		9		
R ₀	M ₀	L ₂	<i>tenuiorelimbata</i>	..	..	6	9 13				
R ₀	M ₀	L ₃	<i>tenuelimbata</i>	..	..	6	40				7
R ₀	M ₀	L ₄	<i>latelimbata</i>	..	..	6	2	15		34	1
						5				1	
R ₀	M ₀	L ₅	<i>latiorelimbata</i>	..	..	6				1	
						5					
R ₀	M ₁	L ₅	<i>latiorelimbata</i> — <i>macula</i>			6				1	
						5					
R ₁	M ₂	L ₅	<i>latiorelimbata</i> — <i>magnamacula</i> — <i>radiis</i>			6					
						5					
R ₀	M ₀	L ₆	<i>latissimelimbata</i>	..	..	6					
						5					
R ₀	M ₁	L ₆	<i>latissimelimbata</i> — <i>macula</i>			6					
						5					
R ₁	M ₂	L ₆	<i>latissimelimbata</i> — <i>magnamacula</i> — <i>radiis</i>			6					
						5					
R ₂	M ₂	L ₆	<i>latissimelimbata</i> — <i>magnamacula</i> — <i>zonata</i>			6					
						5					
R ₃	M ₃	L ₇	<i>seminigrata</i>	..	..	6					
						5					
R ₄	M	L ₇	<i>biguttata</i>	..	..	5					
			<i>guttata</i>	..	..	5					
R ₄	M ₄	L ₈	[<i>parviguttata</i>]	..	..	5					
R ₄	M ₅	L ₉	<i>nigrata</i>	..	..	5					
						51	26	15	9	37	8

nervure, form **magnamacula**. The form with dark rays extending to the base of the wing I call **radiis**. Usually the first to appear is the one just behind the cubital nervure; when it is accompanied by one or two others and they broaden so as to blend together they form that large triangular patch which characterises form *zonata*, Rocci, already described; as a rule, however, when that triangle is extensive, it is accompanied by other rays and we have what might be called the **radiis-zonata** form. The two little rays which are inside the cell nearly always fuse with the spot, or spots, at their further end and turn it, or them, into one or two long streaks, just as the rays at the back of cell fuse with the marginal band; the red spots N.3, in the cell, and N.4, at the back of it, very rarely subsist and keep the rays separate from these other markings. The next grade in the extent of the dark markings answers to *seminigrata*, Rocci, described as having red rays at base and two red spots, because the primary dark pattern begins to prevail greatly in extent on the secondary red one; it corresponds to nymotypical *stoechadis*. Then come *biguttata*, Rocci, with no

some Italian races of subspecies *stoechadis*, Bkh.

<i>montivaga</i>	Bolognola	<i>montiv. tr. ad. medicaginis</i> Fontebuona	<i>etrusca</i>	Florence	<i>oraria</i> Forte d. Marmi	<i>medicaginis</i> Futa Road	<i>stoechadis</i> Palazzuolo	<i>stoechadis</i> Firenzuola	<i>aterrima</i> Prato Fiorito	<i>aterrima</i> Piteglio							
♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀						
	2																
10	10	1	18	9	18	2	3	4									
1	1	5	10	5	2	1	1										
6		8	5	11	2	3	2	4	2	1							
7		14	2	11	3	3	1	4	5	1							
3		6		2		2	1	2									
2		4		3	9	5	1		2								
2				1		3											
1		3	2	4	1	2	1										
		2					1	1		1							
		2				1	1		1								
		3		13	1	2			4	1							
1			1	1		1		1	5								
2		3		3	6	3	5	4	5	4	6	19	2	3			
					1	1	4	4	1	3	1	6	18	1			
					4		3		2	1	7	2	12	7	1	3	
							1		1		2		2				
						3	1	7	3	19	8	4	1	(3)			
								1			1						
35	18	51	26	59	32	39	24	32	23	22	16	22	29	45	67	12	10

red rays, and *guttata*, mihi, with only one red spot, corresponding to *aterrima*, Vrtý., and finally *nigrata*, Dz., in which the dark spot fills the cell to its further extremity and obliterates red spot N.5. Forms *biguttata* and *guttata* are not so much successive grades as parallel to each other, like the homologous six- and five-spotted forewing forms, due to the greater or lesser effects of the "atrophyed zone" on the pattern.

In the following statistical table I have endeavoured to show at a glance how the leading individual forms are distributed in several Italian races. They are the races of which I possess sufficiently extensive series of specimens collected at random to show variation as it occurs in nature. In the first column the various parts of the pattern are designated by letters and their extent by figures, so that putting them together "formulae" are obtained expressing the individual variations much more briefly and clearly than the compound names of the second column. I think that a method of this sort will be found necessary in future, now that analytical studies are pushed

always further. Grades should be established on the variation of the entire species, beginning by nought when the character is missing. In this case I have made no artificial division in a series of equivalent grades, but I just set down those which were suggested by the extent of variation in the different races and by noticeable individual forms. As I have remarked in the case of the marginal band, the difference between two successive grades is very much smaller at the two ends of the series than midway, but the effect in producing a different aspect of the insect is quite as great. This, I think, will be found to be quite a general rule.

In the table, I have enclosed between two horizontal lines two grades, which constitute a collateral branch of the main line of variation and which are parallel to the ones immediately following, as shown by the figures of the formulæ. If the breadth of the marginal band was to be divided in a larger number of grades about this level, each of these would involve the creation of a similar collateral branch, because each is accompanied very often by the cellular spots and by the rays. Form *zonata*, Rocci, constitutes a little branch of this sort, which would have stood, had it existed in the races dealt with in the table, just after *latelimbata*, with the formula: $R_2 \cdot M_0 \cdot L_4$. Form *seminigrata*, Rocci, with six spots on forewing, I have marked on the table, although no specimen represents it there, to show that it does exist (nymotypical *stoechadis*, as described by Borkhausen). *Ab. parviguttata*, Rocci, I have enclosed in brackets, because it is not in every way the grade which precedes *nigrata*, Dz., having the red spots of forewing very reduced, as well as the one of hindwing, which is in no way necessarily the case in the latter. At Piteglio it is not as frequent as the figure would show.

Summary of the French and of the Italian races of subspecies *stoechadis*, Brkh. (The locality of "types" is marked by inverted commas. The other localities mentioned are those from which I possess specimens):—

Group of races constantly six-spotted on forewing, with a broad red suffusion on underside and with very narrow or narrow marginal band on hindwing (*tenuissimelimbata* to *latelimbata*), but with no other primary pattern:

Race *microchsenheimeri-pulcherrima*, Vrty.: Basin of Po, locally.

Race *siciliensis*, Vrty.: "Mt. Cuccio, m. 800, near Palermo."

Race *calabra*, Vrty.: "Altipiano di Carmelia, m. 1200, in the Aspromonte (Calabria)."

Race *calabra-ochsenheimeri*, Vrty.: "S. Fili, m. 900, on the Calabrian Coast range."

Race *major*, Esp.; "South of France"; Montpellier, according to Oberthür.

Race *ochsenheimeri*, Z.: "Italy" ("and southern France"); Rome; Aurunci Mts. in S. Latium; valleys of the Adige and the Isarco in S. Tyrol.

Subrace *campaniae*, Stdgr.: "Roman Campania."

Subrace? *judicariae*, Calb.: "S. Tyrol, north of lake of Idro."

Race *microchsenheimeri*, Vrty.: "Villatina, m. 500, in the Mainarde Mts. in S. Latium"; Basin of Po, locally (Primaluna, m. 550, in Val Sassina, near lake of Como); Gèdre, m. 1000, in the Hautes-Pyrénées.

Race *microchsenheimeri* trans. ad *montivaga*, Vrtý.: "Casteldel-monte, m. 1500, on the Gran Sasso (Abruzzi)."

Race *microchsenheimeri* trans. ad *medicaginis*, Vrtý.: Basin of Po, locally.

Group of races which produce commonly both the five- and the six-spotted form, in which the red suffusion on underside of forewings is usually absent or reduced, when it exists, to a narrow streak on cubital nervure and which have, to a greater or lesser degree, a broad marginal band on hindwing (mostly *latiorelimbata*, more rarely *latissimelimbata*) and the beginning of other primary pattern markings:

Race *pyrenes*, Vrtý. (= *dubia* of Obth.): "Vernet-les-Bains in the Pyrénées-Orientales."

Race *duponcheli*, Vrtý. (= *medicaginis* of Duponchel and of Oberthür): "Nice"; Region not distant from the coast of the Alpes Maritimes Department.

Race *ochsenheimeri* trans. ad *etrusca*, Vrtý.: "S. Pietro Avellana, m. 960, in the Molise (Neapolitan district)."

Race *montivaga*, Vrtý.: "Bologna, m. 1200, in the Sibillini Mts. (Piceno)."

Race *montivaga* trans. ad *medicaginis*, Vrtý.: "Fontebuona di Vaglia, m. 400, near Florence"; Vuctanido, m. 500, in the Mugello, near Florence.

Race *etrusca*, Vrtý.: "Pian di Mugnone, m. 200 to 300 (Florence)."

Race *pulcherrima-stoechadis*, Vrtý.: "Hills above Modena and Reggio (Emilia)."

Race *oraria*, Vrtý.: "Forte dei Marmi, on sea-coast of Northern Tuscany;" Antignano, near Leghorn.

Groups of races very predominantly five-spotted on forewing, with no red suffusion on underside and with very broad marginal band (*latissimelimbata*) and usually an extensive primary pattern on hindwing.

Race *medicaginis*, Hüb. (= *medicaginis*, Boisd. = *dubia*, Stdgr.); "Piedmont;" Futa Road, at La Traversa and Covigliaio, m. 700 to 900, in N. Tuscany.

Race *stoechadis*, Brkh.: "Piedmont;" Maritime Alps, also on French side; Mt. Sumbra, m. 1400, in the Apuane Alps in the N.-W. of Tuscany; Palasaccio, m. 500, near Firenzuola, north of Florence; Palazzuolo di Romagna, m. 700, in the N.-E. of Tuscany.

Race *gigantea*, Rocci: "Quezzi, on sea-coast, near Genoa."

Race *atterima*, Vrtý.: "Mt. Prato Fiorito, m. 400 to 1000, above the Baths of Lucca;" Piteglio, m. 700, above Pistoia in the province of Florence.

New British Cecidomyidæ. I.

By RICHARD S. BAGNALL, F.R.S.E., F.L.S., F.E.S., and J. W. HESLOP HARRISON, D.Sc., F.R.S.E.

During the period that has elapsed since our last contribution dealing with this group much material has accumulated, and we take this opportunity of presenting the results of our researches to other workers. We would particularly draw attention to the remarkably

minute or obscure nature of many Cecidomyid galls such as those recorded from Lime, Sycamore, Helianthemum, Spiræa, etc.

Prolasioptera niveocincta, K.

Produces a gall similar to, but less fusiform and a little larger than that of *Perrisia francoisi*, K., on *Achillea millefolium*; larva red.

NORTHUMBERLAND and DURHAM, coast, rare.

Rhopalomyia palearum, K.

On *Achillea ptarmica*, chaffy bracts of head swollen slightly, larva solitary, white.

DURHAM, Birtley Fell.

Similar larvæ (solitary) found in heads of *Achillea millefolium* at Fordcombe in Kent apparently belong to the species.

Misopatha hypogaea, F. Loew.

On *Chrysanthemum leucanthemum*. Flowers hardened, discoloured, conical, sometimes only slightly atrophied; buds also attacked and when axillary affecting the stem.

DEVON, Babbacombe in October, 1918, midges bred immediately; Sidmouth, September, 1920.

Oligotrophus origani, Tavares.

On *Origanum vulgare*. Terminal gall formed of large leaves with many red larvæ; cocoons white.

DEVON, Sidmouth, rare, September, 1920.

Macrolabis prunellæ, K.

On *Prunella vulgaris*, flower deformed, shortened, larvæ white.

DURHAM, Gibside, August, 1920.

Macrolabis lamii, Rübs.

B. and H. 63c.

Macrolabis lonicerae, Rübs.

On honeysuckle, two or more terminal leaves enclosing larvæ.

KENT, Tunbridge Wells, September, 1918.

Macrolabis lucetii, K.

On *Rosa pimpinellifolia* and *R. reuteri*, leaves thickened, folded and reddened, larvæ white.

NORTHUMBERLAND and DURHAM, chiefly on the coast.

Arnoldia sambuci, K.

On flowers of *Sambucus niger*, flower closed, slightly swollen, larvæ non-leaping, white.

DORSET, near Swanage, rare.

Arnoldia gemmae, Rübs.

In galls of *Andricus fecundator*, = B. and H. 399.

Rhabdophaga gemmarum, Rübs.

On enlarged buds of *Salix aurita* and *S. cinerea*.

DURHAM and NORTHUMBERLAND, widespread in sub-alpine districts.

Rhabdophaga jaapi, Rübs.

On *Salix repens*, small somewhat elongated leaf-rosette.

DURHAM, Blackball Rocks.

Rhabdophaga nielsenii, K.

On *Salix pentandra*. Stem very slightly swollen, reddish larvæ feeding in cavities in wood and pith; larva hibernates therein, and the stem blackens just prior to emergence of the midges.

DURHAM, Walldridge Fell.

Rhabdophaga sp.

On *Salix aurita*, Houard S. 22.

DURHAM, Gibside.

Schmidtella gemmarum, Rübs.

B. and H. 23. Houard No. 125.

NORTHUMBERLAND, DURHAM, LANCASHIRE and WESTMORLAND. Scattered in Juniper areas.

Perrisia auritae, Rübs.

On *Salix aurita*, *S. cinerea*, leaves rolled as in *P. marginemtorquens*; larvæ distinct.

NORTHUMBERLAND and DURHAM. In sub-alpine localities not uncommon.

Perrisia bistortae, K.

On *Polygonum bistorta* and *P. persicaria*; similar to gall of *P. persicariae*, larvæ white.

NORTHUMBERLAND, Bamburgh, Prestwick Carr and Elcheester.

Perrisia bryoniae, Bouche.

By a slip of the pen this species was recorded (B. and H. 105) in place of *P. parvula*. This forms a terminal irregular rosette of pilose leaves on *Bryonia dioica*, larvæ white.

HERTS, near Letchworth, June, 1920.

Perrisia angelicae, Rübs. = B. and H. 365.

Excessively abundant on flowers of *Angelica*.

NORTHUMBERLAND, DURHAM and N. YORKS, everywhere.

Perrisia dittrichii, Rübs.

On *Silene pratensis*, leaves thickened and crumpled, larvæ yellow.

NORTHUMBERLAND, Seaton Sluice. DURHAM, nr. Fatfield.

Perrisia françoisii, K. = B. and H. 394.

Perrisia fairmairei, K. and
Perrisia silvestris, K.

On *Lathyrus silvestris*, flowers remaining closed, slightly swollen, larvæ red, or yellowish-white.

DEVON, Sidmouth, September, 1920, both species.

Perrisia excavana, Rübs.

On honeysuckle, pustule on leaf with excavation on lower side, minute.

NOTTS, Barnby Moor, June, 1920. DEVON, Hartford Woods near Sidmouth, September, 1920.

Perrisia gallica, K.

On *Ulex*, flowers remaining closed, containing apparently immature small, semi-translucent, pinkish larvæ.

DEVON, Sidmouth, September, 1920.

Perrisia inflatae, Rübs.

Red larvæ in galls of *Perrisia floriperda* on *Silene inflata*.
DEVON, Torquay, October, 1918.

Perrisia jaapiana, Rübs. Possibly = B. and H. 119.

Perrisia lamiicola, Mik.

On *Lamium album*.

DURHAM, Beamish; NOTTS, Barnby Moor; DEVON, Hartford Woods, nr. Sidmouth.

Perrisia loewiana, Rübs. B. and H. 220 in part, and Houard No. 3723.

Perrisia parvula, Liebel. = B. and H. 205.

But see remarks under *P. bryoniae* on *Bryonia dioica*.

DURHAM, Lamesley; HERTS, near Letchworth.

Perrisia peinei, Rübs.

In galls of *Perrisia sanguisorbæ* with yellow larvæ.

DURHAM, Gibside, July, 1920.

Perrisia pratensis, K.

On *Lathyrus pratensis*, flowers showing chloranthia, massed with numerous white larvæ.

NORTHUMBERLAND, Tynemouth, July, 1920.

Perrisia rhamni, Rübs.

On *Rhamnus frangula*, flowers closed and slightly swollen; larvæ ivory white.

SURREY. Plentiful, Hindhead, June, 1920.

Perrisia rubicundula, Rübs.

= B. and H. 266, in part; scattered in the North.

Perrisia sampiana, K.

On *Linum catharticum* and *Radiola linoides*.

DEVON, Sidmouth, rare, September, 1920.

Perrisia saxifragae, K.

On *Saxifraga granulata*, flower closed, larvæ yellow.

DURHAM, Langdon Beck, in Upper Teesdale.

Perrisia spadicae, Rübs.

= B. and H. 220 and Houard 3723 in part. See remarks under *P. loeviana*.

Perrisia spiraeae, Lois.

On *Spiraea ulmaria*. Flower remaining closed, reddish and minutely pilose; larvæ solitary, red.

DURHAM, in a lane between Lamesley and Birtley, July, 1920.

Perrisia teucrii, Tav.

On *Teucrium scorodonia*, October, 1918.

DEVON, Torquay.

Perrisia tympani, K.

On Maple.

DEVON, Torquay, October, 1918.

Jaapiella (*Perrisia*) *cirsicola*, Rübs. B and H. 114.

Jaapiella volvens, Rübs.

On *Lathyrus pratensis*, galls like those of *P. schlechtendali*, larvæ whitish-yellow to reddish.

Not rare and generally distributed.

(To be continued.)

Descriptions of four new Orthoptera from Macedonia.

By B. P. UVAROV, F.E.S.

The following four new Orthoptera are described from a collection made by Dr. Malcolm Burr and Dr. B. P. Campbell during the War in Macedonia, and presented by Dr. Burr to the British Museum where the types are preserved. The co-types of three of them (*i.e.*, all except *Ancistrura truncata*, sp.n.) are in the Hope Museum, Oxford, in Mr. Burr's and my own collections.

1. AEOLOPUS BURRI, sp.n.

♂. Rather small for the genus, and reminding one somewhat of a *Dociostaurus* in its habitus and in the type of coloration.

Head large and thick, distinctly prominent above the pronotum. Front only feebly reclinate; frontal ridge convex, with a very small impression just below the middle ocellum, sparsely and feebly punctured; the margins of the ridge very slightly divergent from fastigium downwards, feebly approximated near the latter and disappearing below it. Face and cheeks smooth, with sparse and fine puncturation. (Antennæ in the type and in co-types broken). Eyes oval, with the

fore margin almost straight. Temporal foveolae elongate, trapezoidal, their upper and hind margins raised and sharp, the front and lower margins obtuse and interrupted by punctures. Fastigium of the vertex sloping, rotundato-hexagonal, scarcely longer than broad, with the apex rotundato-truncate, margins sharp. Occiput convex. Pronotum slightly longer than the head, feebly but distinctly constricted in its middle; its maximum width distinctly less than that of the head; in profile the pronotum is perfectly straight above; the whole fore margin, except in the lower parts of the lateral lobes, distinctly incrassate, embracing the head like a collar; the first transverse sulcus reaches but does not interrupt the median keel; the second sulcus reaches halfway between the sides of the disc and the keel; the third sulcus placed scarcely before the middle of the pronotum, cutting the median keel; metazona distinctly punctured in the disc, as well as in the lateral lobes, which are smooth in the prozona; hind angle of the disc obtusely rounded. Lateral lobes of the pronotum impressed a little below and behind the middle; higher than long; their fore margin slightly sinuate; the lower margin with an obtusely rounded angle in the middle; hind margin almost straight; the fore angle very obtuse, rounded; hind angle a little more than 90°, rounded. Elytra extending just a little beyond the hind knees; mediastinal area dilated (its widest part is at the apex of the basal third), extending over two-thirds of the whole length of the fore margin, with a rather feeble false vein which does not reach the apex of the area; scapular area as wide as the mediastinal, callous and not transparent in the basal half, with sparse reticulation and an irregular, interrupted false vein; discoidal area parallel-sided, with the intercalate vein approaching apically to the radial vein; interular area nearly twice as broad, in its widest part, as the discoidal, with an irregular false vein. Hind femora short, rather broad, though less dilated than in *A. strepens*, with the apex scarcely attenuate. Hind tibiae slightly shorter than the femora. Supra-anal plate elongato-rotundate, with a basal longitudinal impression. Cerci cylindrical, rather thick, very slightly incurved, with the apex obtuse. Subgenital plate very obtuse.

General coloration dull greyish-buff, with not well defined blackish design. Fastigium of the vertex with indefinite blackish points and blackened margins; occiput with two scarcely perceptible blackish longitudinal fasciae, which run from the hind angles of the fastigium gradually diverging and fading towards pronotum; a second pair of black fasciae is behind the eyes. Eyes buff with a small blackish spot behind the apex. Disc of the pronotum greyish-buff; the X-shaped design yellowish in its middle and light orange in its fore and hind parts, rather broad, especially so in metazona, and very irregularly marginated from both the inside and the outside by diffused blackish fasciae; lateral lobes buff, merging into dark grey upwards, with a small blackish spot in the middle, somewhat orange towards the hind margin. Elytra greyish buff, hyaline apically, an elongate brown spot in the basal half of the mediastinal area; scapular area sulphurous basally; discoidal area with a few scattered small brown spots in two groups—one near the base and the second, which consists of confluent spots, at the apex; a larger, elongate blackish spot just beyond the apex of the discoidal area, emitting a short branch towards the fore margin, across the scapular area but not extending into the mediastinal area; the apical part of the elytra with a few very pale grey spots. Wings hyaline, with the apex scarcely infumate. Hind femora on the outside buff, with three very feeble grey bands and a blackish line along the middle of the basal half of the externo-median area; the inside pale with a small black spot at the upper part of the base and two black transverse fasciae, the second of which is narrower than the first one; the lower sulcus sanguineous, with a narrow black fascia, corresponding to the second inner fascia, and with the apical part pale; the knees black all round. Hind tibiae pale, with the base and a ring at the end of the basal third black; the apex reddish, slightly blackened beneath; the spines pale with black apical halves.

		♂ (type).	♀ (paratype).
Length of body	...	19 mm.	24 mm.
"	" pronotum	3.5	4
"	" elytra	15.5	16
"	" hind femora	10.5	11
"	" " tibiae	9.	9.

The type is from Lembet, 25, vi.-4, vii., 1916; two paratypic females were taken at the same locality in August, 1918.

One of the females agrees in its coloration with the above described male, while another female, being entirely identical with it in all the morphological characters, is green with only feeble traces of the typical design on the head, pronotum and elytra. This indicates that the new species is variable in its coloration, like other species of the genus *Aeolopus*, but it is very well defined in its morphological characters.

The chief specific characters of *A. burri* are the large and thick head, the broad and obtusely truncate fastigium of the vertex, the shape of pronotum and the relative shortness of elytra. The form of the fastigial foveolæ, as well as the position of the false vein in the discoidal area and not sulcate frontal ridge are the characters which separate *A. burri* from *A. tergestinus*, Mühl. From *A. strepens* the new species is easily distinguished by the shape of pronotum, which is not unlike that in *A. thalassinus*, F., by the form of hind femora which are short but not dilated as is the case in *A. strepens*, as well as by the coloration of elytra which is so characteristic in *A. strepens*. The distinctive characters of *A. burri* from *A. thalassinus*, to which the new species is most closely related, are also numerous and leave no doubt as to their specific value; the principal distinctions between these two species are in the shape of the head, and especially of the fastigium, in the relative length of the prozona and metazona of pronotum, as well as that of hind femora and elytra. All this proves that the species is undoubtedly new, and I have much pleasure in dedicating it to my friend, Dr. Malcolm Burr, who has done so much to increase our knowledge of Orthoptera in general.

I should propose the following key for identification of the four European species of the genus *Aeolopus*:

1. (6) Temporal foveolæ elongato-trapezoidal. Frontal ridge not sulcate. Intercalate vein in the discoidal field approaching apically to the radial vein.

2. (3) Pronotum distinctly tectiform, without a constriction; its disc only slightly narrowed forwards. Elytra in the most part black, with two narrow transverse fasciæ. Metazona one half again as long as prozona. Hind femora short and much dilated basally, with the apex attenuate; hind tibiæ distinctly shorter than femora. Elytra extending distinctly beyond the hind knees.

A. strepens, Latr.

3. (2) Pronotum decidedly selliform, with a distinct constriction; its disc distinctly narrowed forwards.

4. (5) Head thick, shorter than the pronotum; face distinctly reclinate. Fastigium of the vertex scarcely longer than broad with the apex decidedly truncate. Elytra only reaching the hind knees. Hind femora short, though not dilated. Hind tibiæ distinctly shorter than femora.

A. burri, Uvar.

5. (4) Head narrow, shorter than the pronotum; face distinctly reclinate. Fastigium of vertex distinctly longer than broad, with the apex acute. Elytra extending far beyond the hind knees. Hind femora narrow and elongate; hind tibiæ scarcely shorter than femora.

A. thalassinus, F.

6. (1) Temporal foveolæ elongato-triangular. Frontal ridge sulcate. Intercalate vein in the discoidal area distant equally from the radial and ulnar vein along its whole course.

A. tergestinus, Mühl.

ANCISTRURA, gen. nov. (PHANEROPTERINÆ).

♂. Fastigium of the vertex short, obtuse. Antennæ very long, setaceous. Pronotum selliform; transverse sulcus distinctly behind the middle; hind margin rather raised, but not inflated, truncate. Elytra free, inflated, oval, coriaceous; the inner margin not angulate; plicate vein thick, callous, irregular;

no other distinct veins or veinlets. Anterior femora nearly twice as long as the pronotum. Mesosternum and metasternum transverse, posteriorly truncate; basal foramina free. Cerci short, cylindrical, feebly incurved, with the apex obtuse. Subgenital plate broad, very strongly recurved, its median keel much raised and produced beyond its hind margin in the shape of a sharp, bean-like tooth.

Genotype:

Ancistrura truncata, sp. n.

This new genus of the group *Odonturæ* is closely related to *Barbitistes*, Charp., but differs from it strongly by the shape of the male cerci and subgenital plate. The very little known *Odontura pulchripennis*, Costa, also belongs to this genus; it has been placed by Brunner v. Wattenwyl* in the genus *Barbitistes*, but that author himself considered it to represent a rather aberrant species.

2. ANCISTRURA TRUNCATA, sp.n.

♂. Reddish-yellow. Antennæ above reddish-brown with the base paler, and pale beneath. Head with the occiput and narrow postocular fasciæ reddish-brown. Disc of the pronotum of the same colour, darkened towards the middle line and hind border, with numerous round brown points; a pale median line runs from the fastigium of vertex backwards through occiput and pronotum; the lateral lobes separated from the disc by yellow longitudinal fasciæ; the lobes themselves are reddish-yellow, darkened towards the pale upper fascia, with brown points, which are especially numerous along the lower margin of the fascia. Elytra pale with a broad black lateral stripe. Abdomen with numerous reddish-brown points. Subgenital plate large, almost vertical, longer than broad, slightly narrowed towards the apex, sulcate along the middle basally and strongly carinate in the apical half; the carina is beak-shaped and extends well beyond the hind margin which is broadly truncate and slightly emarginate in its middle; hind angles straight; the basal part of the plate and the carina, except its apex, yellow; the apical half and the apex of carina brown. All tibiæ with two upper carinæ black.

Length of body ... 13 mm.

(much contracted in the type; probably about 16-18mm in living insect.)

„ „ pronotum	... 3.5
„ „ elytra	... 4.5
„ „ fore femora	... 6.5
„ „ hind „	... 16

The type of this species is unique; it was taken by Dr. M. Burr at Lembed, Macedonia. 6. vii. 1916.

This species is very much like *A. pulchripennis*, Costa, known from Italy, but in the Italian species the subgenital plate is narrowed apically while in the Macedonian one it is broadly truncate.

3. SAGA CAMPBELLI, sp.n.

♀. Small and slender, resembling *Saga puella*, Wern. Pale green with a whitish fascia, running along the lower margins of the pronotum, mesonotum and metanotum, and with two less sharply defined yellowish fasciæ along the sides of the abdomen. Face smooth, pale. Pronotum about twice as long as broad; its fore margin scarcely and the hind one very feebly raised; lateral lobes with the lower margin distinctly dilated near the hind angle which is straight; the fore angle perfectly straight. Elytra and wings absent. Hind femora very slender, four and half times as long as the pronotum. Subgenital plate triangular, feebly attenuate towards the apex which is shallowly rotundato-emarginate. Ovipositor almost straight, rather thick, about three times as long as the pronotum; its upper margin in the apical third denticulate, the lower margin with slightly larger but less dense denticulation in its apical fifth part only.

* *Monographie der Phaneropteriden*, p. 58.

♂ (paratype). Hind margin of the pronotum slightly more raised than in the female. Elytra extending slightly beyond the hind margin of the metanotum; chirping apparatus developed; the raised part and the horizontal margins coriaceous. Supra-anal plate small, lanceolate. Cerci large, compressed dorso-ventrally, with acute incurved apical tooth. Subgenital plate with a feeble median carina and an angulato-rotundate apical emargination.

	♀ (type).	♂ (paratype).
Length of body	55mm.	53mm.
" " pronotum	9.5	9
" " elytra	—	7
" " fore femora	18.5	18.5
" " middle femora	17	18
" " hind femora	41	44.5
" " ovipositor	27	—

The type is from the Hortiak Plateau, near Salonika, 15-18 viii. 1918; several paratypes of both sexes are from Lembet.

The species is very distinct from any other species of the genus *Saga*, being somewhat like *Saga puella*, Wern., but easily distinguished from that species by the length of the ovipositor which in *S. puella* is only about half as long again as the pronotum.

4. GAMPSOCLEIS ABBREVIATA subsp.n. EBNERI.

The collection includes a very long series of the insect which agrees well with Brunner v. Wattenwyl's description of *G. abbreviata* as well as with the female of that species in the British Museum, identified by Brunner himself, but differing in the size and coloration. The named author himself mentioned (*Prodromus Europ. Orth.*, p. 319) that the Macedonian representatives of *G. abbreviata* are smaller than the typical ones from Dalmatia. Prof. R. Ebner, of Vienna, kindly informed me that he also has this small Macedonian form of *G. abbreviata* which he compared with the Brunner's types and could not find any morphological differences. I believe, therefore, that Macedonian specimens represent a southern geographical race of *G. abbreviata*; my opinion has been also endorsed by Prof. R. Ebner and I have much pleasure in naming the insect after this eminent Orthopterist, who has done so much for the study of the Balkan fauna. The diagnosis of the new subspecies is as follows:

Size distinctly smaller than in the typical *abbreviata* (from Dalmatia); elytra relatively shorter and not exceeding the pronotum in length. General coloration light-buff with grey and black design, without any greenish shade. Ovipositor slightly more decurved than in the typical form.

The dimensions of both sub-species are, as follows:

	Type.	Sbsp. <i>ebneri</i> .	Paratypes.	Sbsp. <i>abbreviata</i> .
		♂	♀	Autotype.
Length of body	28mm.	23-28mm.	26-30mm.	40mm.
" " pronotum	9	8	8.9	11
" " elytra	6	6-7.5	4.5-6	13
" " hind femora	25	22-25	24-26	27
" " ovipositor	19	—	16-20	28

Described from 49 ♂♂ and 64 females from Lembet and other localities near Salonika, Macedonia.

CURRENT NOTES AND SHORT NOTICES.

A considerable amount of current entomological literature has come to hand during the last few months of which pressure on our restricted space has prevented previous mention. The belated *Bolletino Lab. Zool. Gen. e Agr.*, Portici, vol. xi., for 1916, has just been received and contains numerous studies on predaceous and parasitic species among "other orders," no less than five of which are by Prof. Silvestri. There are seven plates and 108 figures illustrating the text. In an interesting article di Majo describes a series of experiments as to the power and ability of the imago of *Bombyx mori* to penetrate the cocoon when rendered abnormal artificially. The current issue of the same periodical, vol. xiv. for 1920, is also largely made up by further valuable contributions from the pen of Prof. Silvestri, in one of which he deals with the Termitophiles of West Africa. Dr. Verity has another of his valuable articles on the variation and distribution of the Lepidoptera of Italy, in which he deals with the Zygænids and the Butterflies of the Massiccio delle Mainarde. The volume has one plate and 108 diagrammatic text figures.

No doubt our readers are already aware that the four volumes dealing with Palearctic species of Seitz' *Macro-lepidoptera of the World*, English edition, are now complete and obtainable from the publishers. We are told that the volume containing the Butterflies of the America Fauna is complete in the German edition and almost complete in the English edition. But owing to an unfortunate dispute between the publishers and the English agents much delay arises in the distribution of the parts in this country. To those who are subscribing for the whole work, we may say that up to part 213 has been received by the Entomological Society of London direct from the publishers.

The usual annual Report on the Progress and Condition of the U.S. National Museum for 1919-20 is interesting reading. One often wishes that a similar report could be issued on our British Museum. What a wonderful record it would be and if judiciously distributed would be a splendid advertisement. 216,871 specimens have been acquired during the year of which no less than 101,554 were zoological. There was a distribution of 4,306 specimens for educational purposes and in addition 16,200 duplicate specimens were used in making further additions by exchange, a practice which might be advantageously copied by our Natural History Museum authorities. Large collections of insects were acquired including 5,500 Lepidoptera from Hawaii and S. America, 2,000 moths from N. America by Dr. Wm. Barnes, 6,000 insects from Honduras, and 5,770 from Florida. The Report is illustrated.

The *Eighteenth Report of the State Entomologist of Minnesota, U.S.A.*, contains as its chief item a "Monograph of the N. American species of *Deraeocoris* (Heteroptera, *Miridae*), with a large number of diagrams illustrating comparative structures," by H. H. Knight. "Studies on the Flight of Nocturnal Lepidoptera," by W. C. Cook, deals statistically with the seasonal factor and also with various phases of the meteorological factors which determine this habit.

Were it not for the capital summary of Robert Adkin, "Migration of Lepidoptera as regards the British Islands," and the report of the

Mosquito Investigation Committee, the title *The South-Eastern Naturalist* would be a misnomer for the year 1920. Although much overdue this hardy annual is always welcome as a reminder of pleasant days spent during the Annual Congress, serving as a means of association between societies in the S.-Eastern area of England. We are glad that the Council has returned to our own printer, with the style of the book as of yore and the Treasurer's blessing.

The staff of the New York Agricultural Experimental Station continue to distribute the admirable pamphlets containing accounts of their experiments on the control of insect pests. "The Control of the Pear Thrips (*Taeniothrips pyri*)," by C. R. Phipps, one of the most destructive pests in the State, and the summary of "Insect Injuries in Relation to Apple-grading," by B. B. Fulton, are to hand. Both are well illustrated, the latter with coloured plates. There are descriptions in the latter of the following insect injuries and suggestions for their prevention:—Codling moth *Carpocapsa* (*Cydia*) *pomonella*, Lesser apple-worm *Enarmonia prunivora*, Oriental fruit moth *Laspeyresia molesta*, Apple maggot *Rhagoletis pomonella*, Green fruit-worms *Graphiphora alla*, *Xylina antennata*, *X. laticinerea* and *X. grotei*, Fruit-tree leaf-roller *Archips argyrospila*, Bud moth *Tmetocera ocellana*, Apple bug *Lygidea mendax*, Red bug *Heterocordylus malinus*, Plum Curculio *Conotrachelus nenuphar*, Apple Curculio *Anthonomus quadrigibbus*, Rosy apple-aphis *Aphis sorbi*, San José scale *Aspidiotis perniciosus*, Rose chafer *Macrodactylus subspinosus*, case-bearers *Coleophora fletcherella* and *C. malivorella*, Apple-seed Chalcid *Syntomaspis druparum*, etc.

The *Fiftieth Annual Report of the Ent. Society of Ontario*, for 1919, contains among other items "Insect Outbreaks and their Causes," by J. D. Tothill, showing that prevalence of an insect pest has usually turned out to be due to the absence of an effective insect control; the results of the experiments on the "Control of the Cabbage Maggot *Phorbia brassicae*," which have been systematically carried out in each state; "The Present Status of Mill-infesting Pests in Canada," mainly consisting of *Ephestia kühniella*, the Mediterranean Flour-moth and the Flour-beetles *Tribolium* spp.; "The Federal Plant-Quarantine Act" and its application and results therefrom, etc., with numerous reports on Insects of the year and Entomological Progress.

Among the Separata from the *Proc. U.S. National Museum*, Washington, we have received "Genotypes of the Elaterid Beetles of the World," by J. A. Hyslop, with full references; "The N. American Ichneumon-flies of the tribe *Ephialtini*," by R. A. Cushman, and "The Dipterous Genus *Dolichopus*, Latr., in N. America," by Van Duzee, Cole and Aldrich, in which the authors say that this Dipterous family "offers such a storehouse of material bearing upon the Darwinian theory of sexual selection that its many beautiful and easily classified species ought to be much more widely known among those who give attention to the larger biological problems. In the present paper a large number of secondary sexual characters are figured, not only as aids to identification, but to give some idea of the wealth of beautiful structures which have been developed in the males of this genus." There are sixteen plates containing several hundred figures besides figures in the text.

The *Annual Report of the Lancashire and Cheshire Entomological*

Society has been received, including the years 1918, 1919, and 1920, and it is a great credit to the Officers of one of the smaller local societies that they have been able, not only to keep going during these troublous times, but to continue the work they had in hand. Among the papers printed are "Recorder's Report on Coleoptera, 1917," by J. R. le B. Tomlin, F.E.S.; "Notes from Cartmel Fell," by Richard Wilding, containing the characteristics of the scenery and remarks on the butterflies and some of the moths and beetles; "Recorder's Report on Lepidoptera, 1919," by Wm. Mansbridge, a useful summary of the work of the members during the year; "The Lepidoptera of Wicken Fen," by L. P. Doudney, a good summary of the capabilities of Wicken, if one is lucky, with many practical hints; "A year's Collecting of Macro-lepidoptera," by S. Gordon-Smith, who seems to have done exceptionally well in a notoriously unfavourable year for entomologists, and includes an account of his breeding and captures at light; and last but not least the continuation of the "Systematic Annotated List of the Lepidoptera of Lancashire and Cheshire," mainly compiled we believe by our old friend the Hon. Secretary, W. Mansbridge from his own and others records of many years past. The value of this List is much enhanced by its containing valuable records as to the occurrence of aberrations and forms, and it registers all the local and racial characters of the species compared with other parts of the country.

The following resolution was recently unanimously passed by the South London Entomological Society, "That this meeting having learned that a scheme is on foot to alienate a considerable portion of Esher Common from public enjoyment by leasing it to a Golf Club Syndicate, desires to express its strong opposition to such a scheme, which it believes to be antagonistic to the general good and conceived solely in the interest of a class already well catered for in the vicinity." The devastations, caused by cutting and subsequent fires over a large area of this district, can be obliterated by careful afforestation and time, but to clear everything off the face of the earth for the recreation of a few only would be an irreparable destruction of one of nature's beauty spots.

We quote from the *Indianapolis Star* of June 11th. "The highest honorary degree that is given by a university was conferred upon W. S. Blatchley by Indiana University when advanced degrees were given on commencement day, Wednesday. The fact that Indiana rarely gives the degree of LL.D. means an unusual distinction for the Indianapolis naturalist." The statement giving reasons for conferring the degree were: "Willis Stanley Blatchley—Native of Connecticut; educated in the schools of Indiana; successful teacher; leader in expeditions of scientific exploration; sixteen years an efficient officer of the state in the capacity of state geologist; a life-long student of natural history; author of literary and scientific books; a nation-wide authority on beetles, weevils and locusts; one of the foremost naturalists of America; interpreter of nature's beauty in woodland and meadow, by wayside and stream, in stones and in flowers. Mr. President, this distinguished alumnus has been recommended by the faculty for the degree of doctor of laws." We congratulate W. S. Blatchley, LL.D., an old friend of the *Ent. Record* and of our revered late Editor.

SOCIETIES.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

March 16th.—The President announced that the Rev. George Wheeler had been obliged to resign the Secretaryship on account of ill-health, and that the Council had elected Mr. H. Rowland-Brown in his place. A vote of thanks to Mr. Wheeler for his services, which extended over ten years, was proposed by the President and carried unanimously.

ELECTIONS.—The following were elected Fellows of the Society:—Captain K. J. Hayward, Aswan, Egypt; Mr. E. Bolton King, Balliol College, Oxford; Mr. L. M. Peairs, West Virginia, U.S.A.; Mr. E. D. Lewis, Swanley, Kent; Mr. W. J. Hall, Cairo, Egypt; Mr. D. Ponniah, Federated Malay States; Mr. H. D. Hope, Jermyn Street, W.C.; Professor Dr. S. Matsumura, Japan; and Professor C. P. Alexander, Illinois, U.S.A.

MIMETIC ASSOCIATION BETWEEN *HELICONIUS* SPECIES.—Professor E. B. Poulton, F.R.S., exhibited a series of butterflies, *Microclea*, from Central Peru, to illustrate the mimetic relationship between *Heliconius notabilis* form *microclea*, Kaye, and *H. xenoclea*, Hew. Mr. J. W. Kaye suggested that the palatability of the two was probably the same.

CLASSIFICATION OF ANTS.—Mr. H. Donisthorpe gave an account of the latest views on the sub-families of Ants, and illustrated his remarks with numerous diagrams. In connection therewith Mr. W. C. Crawley exhibited representatives of each of the two groups separated by Wheeler, and remarked that the large Termite ants could be heard by their kind.

MESOPOTAMIAN BUTTERFLIES.—Lt.-Col. Peile, I.M.S., brought for exhibition a collection of butterflies made by him in Mesopotamia. These included a new species of *Lycaena*, with the Blues with which it was taken in company, with a new sub-species of *Zegris eupheme*, viz., subsp. *dyala*, which occurs at Fathah on the right bank of the Tigris, differing from var. *menestho*, Men., in the absence of the yellow suffusion in the ground colour of the hindwing, and from ab. *tschudica*, H.-S., in having more white in proportion to the green; and *Melitaea trivia* var. *persea*, Koll., the seasonal forms from various localities in Mesopotamia and the North-west Frontier of India.

ABERRATIONS OF *P. MACHAON* AND OF *P. PLANTAGINIS*.—Mr. E. B. Ashby exhibited an example of *Papilio machaon* ab. *rufopunctata*, Wheeler, from Les Voirons, Haut-Savoie, and a series of *Parasemia plantaginis* from the Col de Faucille above Gex, Ain, in the French Jura, showing a great diversity of variation. One specimen he thought might be referred to *matronalis*, but the President did not support this view, the melanism not being sufficiently pronounced.

TERATOLOGICAL ABERRATIONS IN LEPIDOPTERA.—Mr. Talbot, on behalf of Mr. J. J. Joicey, exhibited teratological aberrations of Lepidoptera, and a case containing several new forms of African Rhopalocera.

PAPERS.—The following papers were then read:—"On some *Chrysomelidae* (Coleoptera) in the British Museum," by Mr. A. M. Lea. "Types of *Heteromera* described by F. Walker and now in the British Museum," by K. G. Blair, B.Sc.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

March 24th, 1921.—LARVÆ OF *R. PHLAEAS*.—Mr. L. W. Newman exhibited the two forms, all green and green and red, larvæ of *Rumicia phlaeas* from Bexley, and reported *Triphaena prænuba* at Sallow.

B. MUCRONATA.—Mr. Main, the "cellar beetle" *Blaps mucronata*.

GNOPHOS SPECIES.—Mr. Edwards, numerous species of *Gnophos* from Central Europe.

ABERRATION OF *C. PAMPHILUS*.—Mr. B. S. Williams, aberrations of *Coenonympha pamphilus* from Scotland and Swanage.

ABERRATIONS OF *M. TILIAE* and *X. FLUCTUATA*.—Major Cottam, *Phryxus livornica* from Southbourne, a melanic *Minas tiliae*, and ab. *costovata* of *Xanthorhoe fluctuata*.

NEWSPAPER IGNORANCE.—Mr. Priske read an extract showing the usual newspaper ignorance of scientific facts.

EARLY NOTES.—Mr. Grosvenor, reported *Pieris rapae* on March 20th, and that *Zygaena trifolii* larvæ had stirred from hibernation.

IRISH RACE OF *E. CARDAMINES*, AND FORMS OF *ERONIA CLEODOXA*.—Mr. Turner, specimens of the *hibernica* race of *Euchloë cardamines* including a form *caulosticta* with large discal spot extended along the costa; and the forms *dilatata* and *erxia* with the type form of the S. African Pierid *Eronia cleodoxa*.

ABUNDANCE OF *A. GROSSULARIATA* LARVÆ.—The abundance of the larvæ of *Abraxas grossulariata* was remarked on and *Pachys strataria* (*prodomaria*) was reported from Finchley.

BITUARY.

John Gardner, F.E.S.

We note with regret the passing of another well-known entomologist in the person of Mr. John Gardner of Laurel Lodge, Hart, Co. Durham, who died on July 21st, 1921, in his eightieth year. He was born at Eggleston in Teesdale but came to Hartlepool as a young man where he carried on business as a timber merchant.

His chief entomological work was amongst the Lepidoptera, in which groups he worked out many obscure life histories, making numerous interesting discoveries. As Mr. J. W. Corder says in a recent letter—"He was undoubtedly the best 'Macro' collector, and next to Sang, in the 'Micros' as well. He was also an indefatigable collector of the Coleoptera, and his collection was merged with those of Bold and Bagnall in the Hancock Museum, Newcastle-on-Tyne." Shortly before he died his collections of Micros and Macros were also presented and housed at the Hancock Museum. It is a great misfortune that he published so little, though his numerous records are to be found scattered in the works of Barrett, Tutt, Fowler, etc., and he rendered valuable assistance in editing the last part of the Northumberland and Durham Lepidoptera Catalogue. He it was that made Greatham Salt Marsh and the Hartlepoons classic ground in the midst of his commercial activities.

He was always cheerful, helpful and generous in giving assistance to many a young collector, who found in him a strong and able adviser. We extend to his widow sincere condolences on the loss of her husband after more than fifty years of devoted married life.—H.S.W.

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AND

Journal of Variation

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Some new records for the Constantinople District and Bithynia.

By MAJOR P. P. GRAVES, F.E.S.

Mr. E. Betts, Observer Officer R.A.F., H.M.S. "Pegasus" has shown me a number of captures which he made last summer during the operations against the Kemalists on the coast near Ismid, which is the eastern boundary of the Constantinople region.

These captures include a good specimen of *Strymon (Chattendenia) w-album* taken on a hill just above Ismid early in June, 1920. This is the first time this species has been recorded for the Constantinople region and is indeed the first detailed record of the capture of this butterfly in Asia Minor that I can discover since Dr. Loew took it near Macri, far to the south of Asia Minor in 1842 or 1843. Indeed I wonder whether Dr. Loew's insect was caught at subtropical Macri or in the high forest-clad ranges behind this feverish little town.

Other records worth noting are *Klugia spini*, Dil Iskelesi, early in June, 1920, *Melitaea athalia* race *mehadiensis*, one specimen, early June, 1920, also at Dil Iskelesi, *Chilades trochilus* and *Hesperia malvae*, second brood, Ismid, July, 1920; *Scolitantides bavius*, Dil Iskelesi and Derinjé, beginning and middle June, 1920; *Everes argiades* resembling my Brusa specimens, from Ismid, July, 1920, and *Leptosia duponcheli* ♀ near Ismid, June. *S. bavius* is clearly fairly widely distributed along this coast. Mr. Betts took a pair this year in *cóp.* at Chamlija, about $1\frac{1}{2}$ miles outside the Scutari suburb of Constantinople in late May. I took a good ♀ at Mavri beyond Pendik on May 27th, and we both found it very frequent at Ekrembey on May 21st, where ♀s were ovipositing on a species of *Salvia*, the ova being laid on the flowerheads of the plant.

Mr. Betts has also taken this local species in Europe near Maidos, Gallipoli Peninsula, between June 10th and June 13th this year (worn ♀s only). Another new record for the Constantinople region is *Hyponophele lupinus* of a form resembling var. *intermedia*. Mr. Betts discovered it at Chamlija on June 19th, and I took five specimens there on June 24th. It did not seem frequent but I have no doubt that I have overlooked it in other localities.

Eugonia polychloros occurred in larger numbers than I had ever seen here at Chamlija in early June, but had disappeared (to aestivate?) by the end of the month. Mr. Betts took *Loweia alciphron* race *meliboens*, one ♂ only at Chamlija, a new locality, this year.

On May 1st this year I took a ♂ *Pontia chloridice* in good order in a beanfield at Chamlija. Mr. Betts had taken one the previous day. On May 15th I took 2 ♂s, while 3 or 4 more fell to Mr. Betts. My records seem to show that this insect is like *P. daphidice* in its emergence, the first brood running into the second without any long interval. The following additional records are worth noting in confirmation of this view. June 1st, two ♂s, one fresh, one fresh ♀ one worn ♀. June 3rd, one large fresh ♂ on the high road to Chamlija. June 5th, three fresh ♂s, one worn ♂. June 10th, 1 fresh ♂, two damaged ♀s. June 17th, one chipped ♂, one fresh ♀. June 19th, one ♂ fresh, one ♀ worn, three or four seen. Mr. Betts on the same day took four ♂s and a worn ♀. June 24th, three fresh ♂s, one worn ♂, one worn ♀. July 4th, two ♀s, one fairly fresh.

Hard to catch unless settled, *P. chloridice* seems to like dry, hot

OCTOBER, 1921.

areas, e.g., beanfields, stubble fields and roadsides. It flies fast, quartering considerable areas, and if frightened goes off at very high speed. I am still uncertain as to its foodplant, but suspect a *Sinapis*, or a *Neslia*. This species also occurs on the European side, witness a small ♂ in the Robert College Collection taken at Rumeli Hissar in May, 1915. The same collection contains another interesting insect, a *Brenthis euphrosyne* from Baghchejik, Bithynia, near the head of the Gulf of Ismid, taken in late April a few years ago. This species occurs in the Amasia region, and Professor Tölg took a specimen in the Amanus mountains, N. Syria, in 1914, but it was not recorded by Mann from Brusa. On the other hand Mann records *B. selene*, which does not occur so far as is known in Greece. One wonders if Mann made a slip, since no one else seems to have taken *B. selene* in Asia Minor, and the insect seems much more local than *B. euphrosyne* even in the mountains of Bulgaria.

New British Cecidomyiidae. 2.

By RICHARD S. BAGNAILL, F.R.S.E., F.L.S., F.E.S., and J. W. HESLOP HARRISON, D.Sc., F.R.S.E.

(Continued from page 155.)

Schizomyia tami, K.

On *Tamus communis*, flower elongated and swollen.
From county DURHAM southwards.

Asphondylia ervi, Rübs.

On pods of *Vicia hirsuta*.
DEVON, rare, Tipton, St. Johns September, 1923.

Asphondylia prunorum, Wachtl.

On Blackthorn.
DEVON, Sidmouth, September, 1920.
NORTHUMBERLAND, Allansford, June, 1920.

Asphondylia pilosa, K.

On *Cytisus scoparius*, ovoid, axillary gall, pilose, terminally produced.
DURHAM, Derwent Valley.
NORTHUMBERLAND, Devils Water.

Asphondylia sp.

Houard No. 5062. Flower of *Scrophularia nodosa*, considerably swollen, hardened, whitish or discoloured; larvæ solitary, clear yellow.
DURHAM, Gibside, August, 1920.
DEVON, Sidmouth, rare on *S. aquatica*, September, 1920.

Contarinia acerplicans, K.

Houard 3982. On Sycamore and Maple. Leaf folding along nervure with white larvæ in cavity.
DURHAM, Dene near Blaydon and near Birtley.

Contarinia chrysanthemi, K.

On *Chrysanthemum leucanthemum*, flower remaining closed, somewhat enlarged.

DEVON, rare, Babbacombe, October, 1918.

Contarinia cocciferae, Tavares.

On *Quercus ilex*, yellow larvæ causing a gall rather like that of *Andricus fecundator*.

DEVON, Sidmouth, September, 1920.

Contarinia frangulae, Rübs.

On *Rhamnus frangula*, flowers closed, somewhat strongly hypertrophied, larvæ yellow.

SURREY, Hindhead, June, 1920.

Contarinia floriperda, Rübs.

On *Pyrus aucuparia* and *P. aria*, flower remaining closed.

Everywhere on *P. aucuparia* in the hilly districts, but on flowers of *P. aria* only in Middlesbrough Park, Yorkshire.

Contarinia medicaginis, K.

Doubtfully recorded in B and H. 281, and now verified.

DEVON, Sidmouth, September, 1920, on *Medicago arabica*.

Contarinia marchali, K.

On seeds of *Fraxinus excelsior*, very rare.

DURHAM, between Lamesley and Birtley, June, 1918.

Contarinia pilosellae, K.

Non-leaping creamy larvæ in flower-heads of *Hieracium pilosella*.

KENT, Penshurst, September, 1920.

Contarinia pulchripes, K.

= B. and H. 5 in part.

NORTHUMBERLAND and DURHAM. Widespread in Tynedale and on the Derwent.

Contarinia molluginis, K.

On *Galium mollugo* and *Galium verum*.

DURHAM, on the coast.

DEVON, Torquay, Sidmouth.

Loewiola serratulæ, K.

On *Serratula tinctoria* with a gall analogous to that of *L. centaureæ*.

DEVON, Torquay, once only, October, 1918.

Clinodiplosis biorrhizæ, K.

On galls of *Teras terminalis* on oak, larvæ reddish-grey to red.

NORTHUMBERLAND, DURHAM and YORKSHIRE. Not uncommon and widespread.

Clinodiplosis artemisiae, K.

Houard 5818. On *Artemisia vulgaris*, flower strongly swollen, globular, cavity large with single vitelline larva.

DEVON, Torquay.

Clinodiplosis auripes, F. Loew.

On *Galium mollugo*, bud galls on subterranean part of stem, rounded, diameter 3-4mm. containing a single larva.

DEVON, Sidmouth, September, 1920.

Clinodiplosis cirsii, K.

On *Cirsium arvense*, mid-rib of leaf with elongate fusiform swelling. SURREY, Boxhill.

Clinodiplosis gallicola, Rübs.

Larvæ yellow-red, inquiline in galls of *Andricus fecundator*. DURHAM, Derwent Valley.

Clinodiplosis rhynchiton, Rübs.

In leaf rollings of the beetle *Rhynchitis betuleti*, larvæ orange-red. NORTHUMBERLAND, Prestwick, Carr. DURHAM, Gibside.

Hygrodiplosis vaccinii, K.

On *Vaccinium uliginosum*. Leaf rolled, leathery, greatly discoloured.

DURHAM, Upper Teesdale, August, 1920.

Acodiplosis inulae, F. Loew.

On *Inula squarrosa*. Hardened unilocular galls, situated near the root in leaf axil, or rarely at extremity, green, or white to reddish when subterranean.

DEVON, Torquay. SURREY, Box Hill.

Isodiplosis involuta, Rübs.

Reddish-grey larvæ in rollings of the beetle *Rhynchitis betuleti*. NORTHUMBERLAND, Prestwick Carr. DURHAM, Gibside.

Stictodiplosis aequalis, K.

On *Senecio jacobaea*. Axillary or terminal bud gall with somewhat hyaline, yellow, jumping larvæ. Leaves shortened and pilose near gall.

NORTHUMBERLAND, Seaton Sluice, July, 1920.

Blastodiplosis artemisiae, K.

Flower head of *Artemisia vulgaris* slightly swollen with bright yellow or vitelline yellow larvæ.

DEVON, Torquay, October, 1918.

(We have not had access to Kieffer's original description.)

Massalongia (?) *aceris*, Rübs. (= *Drisina glutinosa*, Giard (nom. nud.)

In slight hollows, faintly discoloured, on underside of sycamore leaves.

NORTHUMBERLAND, Bamburgh, Ovingham. DURHAM, Beamish.

Coprodiplosis sp.

Feeding in galleries on *Cirsium arvense* produced by the Noctuid *Gortyna ochracea*.

DURHAM, Birtley.

Lestodiplosis vorax, Rübs.

An inquiline, with hyaline larvæ in galls of *Perrisia galii*.

NORTHUMBERLAND and DURHAM. On the coast.

* * * *

New plant for species already recorded.

Contarinia viburnorum, K., and

Syndiplosis lonicearum, F. Loew.

Both species on *Viburnum lantana*, various localities in the South.

Perrisia pustulans, Rübs.

On *Spiraea palmata* in a garden.

NORTHUMBERLAND, Hexham.

Clinorrhyncha millefolii, Wachtl.

On *Achillea umbellata* and *A. argentea* in a garden.

DURHAM, Birtley, July, 1920.

(To be continued,)

Catalogue of a small collection of Lepidoptera made by Dr. Malcolm Burr in the Trans-Caucasus in 1915.

By G. T. BETHUNE-BAKER, F.L.S., F.Z.S., F.E.S.

When in the year 1915 our friend and colleague Malcolm Burr journeyed in Russia, he extended his expedition into the Trans-Caucasus where he was able to devote a little leisure time to entomological pursuits and he kindly gave me the Lepidoptera he then collected. I promised him then I would write some notes on his captures and I am now redeeming that promise, late in time though it be. At Omparetti on June 21st three butterflies were taken, viz., *Gonepteryx rhamni*, a quite freshly emerged specimen, one *Pyrameis cardui*, and one recently emerged *Brenthis euphrosyne*. From July 7th to 13th Dr. Burr was staying at Geok Tepe in Aresh and most of the specimens to be recorded will be seen to have been taken at this place. His captures include a pair of *Colias croceus*, one *Pieris* (*Pontia*) *daphidice* var. *raphani*, two *Pararge megera*, both females, three *Limenitis camilla*, one quite fresh *Epinephele lycaon* and one female *Epinephele jurtina*, which from its large size should be *hispulla*, but which is decidedly darker than the general run of that form. Of

the *Lycaeninae* a nice little series of *Tarucus balkanica* var. *areshana*, was taken, these puzzled me considerably at first, and I thought then it was *T. theophrastus*, an examination, however, of the genitalia, proved it to be *balkanica*, but so well marked a race that I thought it quite worthy of a name (see *Tr. Ent. Soc. Lond.*, 1918, p. 277). I am glad to be able to make a correction in reference to this species, I stated there (*l.c.*) that the locality was Geok Tepe, Aresh, Trans-Caspia, how I made this slip I am quite unable to say, it should be, of course, Trans-Caucasia. Of other *Lycænids* my friend took a long series of both sexes of *Polyommatus icarus*, somewhat variable in size and generally with rather dark undersides, but with no approach to the form *persica*. This was the only other species of this family. Three species of *Hesperids* were taken belonging to the genus *Parnara*, viz., one *P. mathias*, one *P. alcides*, and two *P. (Gegeenes) nostrodamus*.

Turning now to the *Heterocera* and taking the *Sphingidae* and the old *Bombycine* genera first, five nice specimens of *Choerocampa (Theretra) alecto* and one *Deilephila (Celerio) galii* fell victims, if I remember aright, to the attractions of light at Geok Tepe, where also were taken one male *Lymantria dispar* and one very pale *Orgyia antiqua*; four nice specimens of the handsome *Aretia hebe* were captured on Mount Kagbek on July 14th; at Gauria, Samkto, two *Spilosoma menthastri* and one *Phragmatobia fuliginosa* var. *fervida* were taken on June 30th, and on July 21st two *Hipocrita jacobaeae* were netted at Omparetti. Very few *Geometrae* were taken, all at Geok Tepe—one *Diastictis clathrata*, that calls for no remark, and four *Ascotis selenaria* v. *dianaria*, a small dark form, however. There is also one ochreous and pink species that I have not yet succeeded in naming. The *Noctuids* are much better represented, *Heliothis dipsacea* was not uncommon, five good specimens being captured, so likewise was *Leucanitis (Grammodes) stolidi*, of which four beautifully fresh specimens are in my collection from Geok Tepe, the *H. dipsacea* were taken at Gauria as well as Geok Tepe, and one specimen of the pretty *Eutelia adulatrix* was taken at each of these two places. At Gauria two *Acronycta megacephala* were captured on June 30th, one of which is a pale mottled form, and the other is darkly suffused all over.

On July 14th on Mount Kagbek two *Epineura popularis*, one *Plusia gamma* and one fine *Hadena adusta* were captured. At Gauria on June 30th, my friend netted a *Sideridis (Leucania) albipuncta*, an *Agrotis suffusa* and an *A. segetum*, also several *Plusia gamma*. Again at Geok Tepe Dr. Burr took five *Mormonia (Catocala) neonympha* a fine *Catocala* with yellow underwings, two *Calpe capucina*, several more *P. gamma* and one *Acontia luctuosa*.

When we consider that our colleague had very little time to devote to entomology, I think he may be congratulated on capturing as many species as he has done and I am grateful to him for so kindly depositing them in my collection.

Seasonal Polymorphism and Races of some European Grypocera and Rhopalocera.

By ROGER VERITY, M.D.

(Continued from Vol. xxxii., page 152.)

Signor Orazio Querci, in his paper on field observations and captures in Peninsular Italy during 1920, has given the readers of

this Journal nearly a full list of the races and seasonal forms of the species collected by him. Only a few remained to be worked out and amongst them not more than half-a-dozen have turned out to be new races, still undescribed. This result is worth noticing: the Querci family, consisting in four energetic and clever entomologists, have collected all through the good season in several very promising and diverse localities, looking out eagerly for novelties. I have spent two months in South Tyrol or Alto Adige (its Italian name), collecting quite a considerable material, both in the field, from the glaciers of the Ortler to the hot valleys of the Adige and the Isarco, and by purchasing the specimens left by the late Herr Arno Wagner, of Waidbruck, a most distinguished field-naturalist, who had devoted many years to the study of the Lepidoptera of that region. I have put together all the writings I could find on it, with a view to the publication of a Catalogue of its races in the *Atti della Società Italiana di Scienze Naturali* and also here, the result is that all the materials I have at hand seem to be well covered by existing descriptions. We evidently can conclude that, on the whole, the races and seasonal variations of the *Zygaenides*, *Grypocera* and *Rhopalocera* of Italy, from the Alps to Calabria are very tolerably known, extending considerably the remark I made last year in connection with Central Italy, in my Catalogue of the races of the Mainarde Mountains, in Southern Latium [*Boll. Labor. Zool. R. Scuola Agr. Portici*, xiv., pp. 33-62 (June, 1920)], which, already Querci and I had been surprised at having found, nearly invariably, quite identical with those of Northern Tuscany.

I wish to lay stress on this remarkable fact, because, but a few years ago, the few lepidopterists who, like myself, undertook to describe and name geographical races, obviously distinct from each other, were made the object of severe criticism, the chief argument against them being that variation is endless and that we would finish by giving a name to the series of every locality. I should scarcely have hoped to be able to confute this assertion as early as this, and in one way, I confess I am sorry the first part of this interesting quest for novelties has already come so close to its end in this country. It should encourage entomologists of other countries to acquaint us as soon as possible with theirs. In Italy the work that chiefly remains to be done, besides the few additions, which may turn up unexpectedly here and there, is to establish the distribution of the various races and the way they blend into each other. An interesting remark one can make, for instance, is that the races of Calabria, situated at the far end of the long Italian peninsula, revert abruptly in some species (10 out of 50 collected), to the aspect these have in the southern part of Central Europe and in the Alps in particular, differing most strikingly, by their larger size and richer, more saturated colouring and markings, from their nearest neighbours of Peninsular Italy in general, characterised, as a rule, by their small size, frail build, markings reduced in extent and colour vivid, but light. The only case in which exactly the opposite occurs, is *Parnassius apollo*, L. Most species have the same aspect in the whole of Peninsular Italy, from Tuscany to Calabria. Only one (*Euchloë cardamines*, L.) exhibits the features of the Sicilian race in Calabria, a rather remarkable fact; it is most distinctly *turritis*, Och., and not *meridionalis*, Vrtý., as Querci

and I had wrongly stated at page 14. The following are a few notes suggested by the material obtained last year :—

Nisoniades tages, L., race *SUBCLARUS*, mihi, second gen. *SUBCLARUS*, mihi.—Whilst collecting this species at Atzwang, Waidbruck, Meran and other very hot localities of S. Tyrol, during the end of July and in August I was struck by the fact that there never occurred in that region the extremely pale form with brownish-grey upperside and yellowish-grey underside which in Central and Southern Italy predominates in the second generation of the hottest and driest localities, and is always more or less frequent in that generation and which I take to be *clarus*, Caradja. The specimens I have collected in the low localities of Tyrol mentioned above are, however, always slightly more brownish and paler, and often markedly more so, than the series I possess, collected by Wagner in the same localities in April and May; these are of a colder tone and usually darker and with a sharper contrast between the whitish and the blackish areas. I conclude that, as in the case of all the species of S. Tyrol, this race belongs to the group of Central Europe. Tutt's descriptions of the various "drab-brown" forms seems to suit the second generation, but each of his names is limited to one of the individual forms it produces; an inclusive name, comprising them all, is necessary, and I suggest that of *subclarus*. As the second generation characterises the races and the first generation seems to be more or less identical in the whole of Europe, just as I have proposed to use the name of *clarus*, Caradja, for the race of Peninsular Italy, I now suggest that of *subclarus* for the races of Central Europe, similar to the one of S. Tyrol, in which the second generation is different from the first, but less so than in *clarus*. I do not know how far Tutt can be right in including the nymotypical *tages* amongst the "drab-brown" forms. The Scandinavian race must be taken as nymotypical, because the first quotation of Linneus is: "Fauna Suecica 1082" and the colour of "fuscis," he gives, translates into dark brown or black, surely by far the most frequent, if not the only colour, in such a northern race, where the second generation does not exist, as stated by Tutt himself at page 284. It seems to me there can be no doubt the first generation and the single generation, which are quite alike, should be considered the nymotypical one. The specimens left to us by Linneus belong to the form *brunnea-alcoides* of Tutt, and thus to this author's "Warm fuliginous-brown" group of forms; they were, however, probably of a much colder tone of grey when fresh, because *tages* becomes brown with age in collections.

Hesperia carthami, Hüb., race *SPECIOSA*, mihi.—The race collected by Wagner in the Isarco Valley, in South Tyrol, differs in the most striking way from the series I possess from the Baths of Valdieri (Maritime Alps), from the Sibillini Mts. (Central Italy), and from the Calabrian Coast Range, which on the contrary are perfectly similar to each other in quite a surprising way, considering how different those surroundings are. On looking up Hübner's figure I found it corresponds exactly to this second race; unfortunately no text exists to inform us as to the source of his type. The race of S. Tyrol differs most constantly from it by the following characters and not one

specimen of either race could be mixed up with the other, such as is not often the case between races. The difference in size gives the impression that the Tyrolese race is gigantic; actual measurements between the wing tips give 29, 31 and 33 mm. as minimum, usual, and maximum expanse in male, whereas the corresponding measurements in the nymotypical race are 25, 27 and 29; the difference between the few females I possess is not as marked, because the ones from Tyrol are smaller than their males. The tone of colour of male is much deeper on both surfaces, chiefly because there is very little of the white dusting, often so extensive and conspicuous in the smaller race; also the white spaces are less extensive and they are notably so on hindwing; on underside the forewings are distinctly black, instead of grey; the hindwings are of a rich greenish-yellow, with white spaces sharply outlined and bordered with brown; in the nymotypical race these wings are usually of a paler colour and the white spaces do not stand out so boldly. A male from Turin and a female from the Simplon in my collection come very near the Tyrolese ones, but they are not quite so distinct. A series from Oberweidan, near Vienna, belongs, on the contrary, to the nymotypical race, but it is a little larger and darker than the Italian series mentioned above. Oberthür's fig. 475-6 in the *Ét. Lépid. Comp.*, represents well Hübner's race, and to the same belongs his figure of form *valesiaca*, Rühl; his *nevadensis* from Sierra Nevada (fig. 474) seems to resemble *speciosa* in size and colour, but being a female, one cannot be sure, and anyhow the latter lacks the peculiar characteristics of the underside of hindwing and antennæ observed by Rambur and quoted by Oberthür. It will be interesting to establish the distribution of two such distinct races of *carthami* in Central Europe.

Powellia sao, Hüb., race *gracilis*, Vrtý., first generation SUBGRACILIS, mihi, and race *sao*, Hüb., second generation PARVULA, mihi.—This species seems to have been neglected by collectors; I have never received any specimens in exchange. The result is, till last year, I was only acquainted with the race collected by myself and Querci in Central Italy, which varies considerably individually and which produces the remarkably minute second generation called by me *gracilis* in the *Ent. Rec.*, xxxi., p. 28, but which, on the other hand, has quite the same aspect from the tops of the Apennines to the seashore. When I saw a few specimens collected on the Coast Range of Calabria and others from the Isarco Valley in S. Tyrol, I was so struck by their appearance, new to me, that I at first took them to be *orbifer*, Hb., which is recorded from the second of these regions and which is found in Sicily. Closer inspection, however, soon convinced me I was mistaken. I should mention that I have not been able to find any confirmation of Kane's statement, quoted by Wheeler, that *orbifer* is found in S. Tyrol, either in nature or in the various local collections I have examined. I next compared my specimens to Hübner's figure of *sao*, the habitat of which he gives as "Germany, in several regions," and I found that it exactly answered to the races, so similar to each other, of S. Tyrol and of Calabria. I thus found out that the race of Central Italy, which I had called *gracilis* on account of its minute second generation, differs from the nymotypical race also in the first

by its notably smaller size and by the distinctness of the white spaces, especially as regards the premarginal series, always quite complete and prominent. A couple I possess from Saal on the Danube seems to correspond to this race, so that one cannot say in an absolute way that Hübner's race is the one of Central Europe and that the smaller one is the southern race, although on broad lines this seems to be the case. I observe that the specimens of the second generation I collected myself at Atzwang at the end of July are distinctly smaller than the spring ones, obtained from Wagner, of the same locality; they are, in fact, only just a trifle larger than the first brood *subgracilis* of Central Italy, differing from it by the characteristics mentioned in connection with the white spaces, of which the premarginal row is nearly always faint and incomplete and often entirely absent, a feature I find only in two mountain specimens out of the 87 in my collection from Central Italy. The expanses of wings, between the tips at the beginning of fringes, are the following: spring *sao* from the Isarco Valley: 22-24mm.; "types" of *parvula* from Atzwang: 20-21; "typical" series of *subgracilis* from Florence (N. 1 to 34 in glass mounts): 18-20; "typical" series of *gracilis* from same locality and from the Fegana Valley, near Lucca: 16-18.

Lowia alciphron, Rott., race *calabra*, Vrtý., trans. ad *romanorum*, Fruhst.—At S. Fili, m. 900, on the Coast Range of Calabria a race was found transitional from race *calabra*, Vrtý. [*Bull. Soc. Ent. Ital.*, xlv., p. 229, pl. I., fig. 43 (1914)], to race *romanorum*, Fruhstorfer [*Intern. Ent. Zeit.*, iii., p. 112 (August 14th, 1909)], the first discovered by Querci in the Piano di Carmelia, m. 1200, on the Aspromonte, the second described from specimens of "the neighbourhood of Rome" and generally distributed in the whole of Central Italy, except where it is replaced locally by *mirabilis*, Vrtý., or by a race transitional to the latter, *ruehli*, Trti. [*Societas entomologica*, xxv., p. 83 (January, 1911)], described from "Cerchio and Celano" in the Abruzzi and which might well be called *mirabilis* trans. ad *romanorum*. In the S. Fili race the males resemble those of *romanorum* by the clear ground colour and small black spots; the females have not got the clear copper tinge of those of *calabra*, but are suffused sparsely with dark scales on all the wings or on hindwing only, in which case they approach form *intermedia*, Stefanelli; this suffusion is never, however, as dense as in most *romanorum* from Central Italy.

Aricia chiron, Rott. (= *eumedon*, Esp), race *GLACIATA*, mihi.—In the magnificent little valley of Sulden, m. 1800, in the meadows at the foot of the moraines of one of the huge Örtler glaciers, in company with the tiny, dark, nymotypical *A. medon*, Hufn., I collected, from August 3rd to 10th, 1920, another small insect, which, at first, rather puzzled me. It was only when it was set and I compared it with the specimens in my collection I realised it was a *chiron*, so different did it look from this species, which, as a rule, varies scarcely at all geographically; it resembles incredibly the female of *P. donzelii*, B. What gives the Sulden race such a peculiar aspect is chiefly its diminutive size, which seems as if it were scarcely half the usual one, the actual expanse being 21 to 23mm. instead of 25 to 29; the shape of the wings is less elongated; the colour has a washed out greyish

appearance, instead of being deep black or dark brown above; fulvous lunules absent or scarcely perceptible. I take this occasion to mention that the race found by Querci in Calabria, both at S. Fili and on the Aspromonte, differs in nothing from the usual nymotypical one, as figured by Esper; fulvous lunules very prominent above in females.

Plebeius insularis, Leech [Butt. China, ii., p. 302, pl. xxxi., fig. 5 and 8 (Jan., 1893)]; race *PRATERINSULARIS*, mihi.; race *CALABRICOLA*, mihi.; race *AEGUSELLA*, mihi.—Readers may be surprised at seeing this name applied to a European species, as it has till now only been used for Leech's nymotypical race of the *Plebeius* from Hakodate in the Island of Yesso (Japan). It seems to me, however, that the rules of the right of priority obliges us to use it in the place of the name *ligurica* created by Courvoisier in 1910 [Ent. Zeit. Stuttgart, p. 81, and Iris, 1911, p. 103, pl. ii., fig. 1] for a Lugano specimen, and used in the same year by Oberthür [Ét. Lép. Comp., iv., p. 201, pl. xli., figs. 291-297], who says he received it under this name from Cassarata. Oberthür himself notes that it is "an intimate ally of Leech's Japanese race," but that it is not quite identical with it. The studies of the genitalia and androconial scales by Reverdin, Courvoisier and Chapman, published by Oberthür [Ét. Lép. Comp., xiv.] in 1917, do not in any way give one the impression that *insularis* and *ligurica* can be distinct species. I can now add that a new race, discovered by Querci in June, 1920, on the Calabrian Coast Range (S. Fili, m. 900), makes it seem quite impossible that a specific difference should ever be shown to exist. This truly magnificent race of large size (27-30mm.) exhibits in fact to their highest degree the features which distinguish the Japanese races from the other European races: on the underside the black markings are all very extensive, especially the premarginal spots and lunules, which are not sharply outlined, but slightly shadowed; the former are entirely covered with vivid metallic scales; between them is a very broad continuous orange band on both fore- and hindwing, of a very warm, reddish-orange; the white spaces preceding the black lunules are nearly entirely obliterated by the dark scaling; in female, also on upperside, the orange lunules are very large and so is the black spot they contain; both are strongly elongated and end in a sharp point. This sex differs from *insularis*, as described and figured by Leech, it being only exceptionally and very limitedly powdered with blue above, but it is perfectly identical with June Japanese specimens I possess and to Oberthür's figure 306. The male differs from Leech's in being of a particularly deep purple, instead of "pale silvery-blue," and in having the black marginal streak more accentuated. Oberthür's male, from Yokohama, fig. 305, is intermediate in colour and has a much narrower streak than *calabricola*. This race is so strikingly different from Leech's, I think it ought to be named and I should call it *praeterinsularis*, taking Oberthür's figures as "types." Some individuals from Calabria are quite similar to the Chinese couple figured by Oberthür (fig. 291-2), which might be called *praeterinsularis* trans. ad *ligurica*.] In Europe five races are known for the present: *calabricola*, Vrtý., from Calabria; *ligurica*, Courv., from Northern Italy (I have collected it in Turin too); *latialis*, Rostagno [Boll. Soc. Zool. It., xi., p. 50 (1911)] (= *mira*, Vrtý.), the much smaller (24-26mm.) race of Central Italy;

aegus, Chapman (in Obth., xiv., p. 42, 1917), from Geneva and Budapest, similar to the Isère couple figured by Oberthür (fig. 296-7), with male of a clearer blue than *latialis* and female more frequently and extensively powdered with this colour; underside a little darker; otherwise very similar to it in size and other characters. Finally I have specimens of the Pollauer Berg in Moravia, which belong to a fifth very distinct race on account of their diminutive size (21-22mm), very deep purple colour in male, with black marginal streak broad, dark grey underside, such as no other race exhibits, and very minute black markings, also quite characteristic; I name it *aegusella*. From Lobau and Rasdorf I have specimens which answer the designation of *aegusella* trans. ad. *aegus*. Race *aegusella* resembles *P. idas*, L.,* more than the others ever do, but though the *genitalia* have not been examined, I feel confident it is co-specific with *insularis*. Were it an *idas* it would be a very distinct race from any other.

* English entomologists and many others cannot identify this Linnean name with any species of butterfly.—G.W. and H.Y.J.T.

***Smerinthus* hybr. hybridus.**

By T. H. COLEBROOK TAYLOR.

I have recently reared a small brood of *Smerinthus* hybr. *hybridus*, which may be of interest on account of the unequal distribution of the sexes. The total number of moths is 25, and of these 22 are males and the remaining three are gynandromorphs, not a single one being female. The observations are made from the external characters only, and it is therefore possible that some of the apparent males may possess female characters internally.

There is considerable variation in the brood and this is chiefly connected with the ocellated spots on the hindwings. The majority are of the usual form, which is too well known to need description, but in four specimens there is scarcely any trace of the spot, while in two others the spot is unusually clearly defined and pupilled.

The parents (♂ *ocellata* and ♀ *populi*), which resulted from larvæ found near Reading, emerged on May 2nd, 1921, and were put in a cage together; on the same day a female *populi* emerged, and this was put in a neighbouring cage. The two moths paired during the night of May 5th-6th and separated at dusk on May 6th.

The female *populi* laid about 150 ova altogether between May 8th and 15th. Of these, nearly all were fertile, but only 50 hatched. The larvæ were sleeved on willow and 25 reached the pupal stage, between July 5th and 12th. The first moth emerged on July 24th, and the last one on August 27th. It is significant that the last three moths to emerge were the three gynandromorphs which are described below:

1. IMPERFECT GYNANDROMORPH.—Preponderantly ♀. Right antenna typically ♀—length 8.8 mm. Left antenna pectinated but not as much as in typical males—length 9.2 mm. The dark brown rectangular blotch, which is always present on the thorax of *ocellata*, is plainly perceptible, but is displaced to the left; it is not confined to one half only as in the next specimen to be described. Otherwise, colouring of thorax uniform. The colouring of the abdomen is uniform, and there are no anal claspers.

Forewings. Expanse: Right 27.5mm., left 29mm.

Width (across centre of wing): Right 9.5mm., left 9.5mm.

Hind margin: Right 14.7mm., left 15.5mm.

Margins of both forewings similar except that the anal angle is more acute in the left.

Markings on right more blurred than on left; ground colour slightly lighter on right than on left.

Hindwings. Expanse: Right 17mm., left 18mm.

Width: Right 9.5mm., left 9.5mm.

Margin slightly more dentated in right than in left, but anal angle more pronounced in left. Ocellated spot, and its dark margin, lighter in right than in left. Reddish basal blotch smaller in right than in left.

Underside. General colouring slightly lighter on right than on left.

2. PERFECT GYNANDROMORPH.—Right side ♀; left side ♂. Right antenna typically ♀—length 9.3mm. Left antenna typically ♂—length 9.6mm. Thorax perfectly halved; right side dark brown dorsally, brownish grey laterally, the dorsal and lateral portions being separated by a white streak; left side uniformly pale grey.

Abdomen: right side brownish grey, left side pale grey; anal clasper absent on right side, but well developed on left. Right side contracted less than left.

Forewings. Expanse: Right 28mm., left 28mm.

Width: Right 10mm., left 8.3mm.

Hind margin: Right 16mm., left 14mm.

Right hind margin less dentated than left; right anal angle less pronounced than left.

Upperside. All markings more distinct, and pale blotches whiter on right than on left.

Underside. Right with basal half pale reddish; left uniformly brown. Ground colour much lighter on right than on left. Pale blotch near hind margin more distinct on right.

Hindwings. Expanse: Right 17.7mm., left 17mm.

Width: Right 10.5mm., left 9.8mm.

Hind margin simple on right, dentated on left. Anal angle less pronounced on right than on left.

Upperside. Ocellated spot on right fairly clearly defined and pupilled, on left dark and blurred. Veining more distinct on right than left. Transverse lines of *populi* less visible on right than on left. Reddish blotch paler and much larger on right than on left.

Underside. Ground colour darker on left than on right. Transverse lines interrupted on left, continuous on right.

3. INCOMPLETE GYNANDROMORPH.—Intermediate between (1) and (2) in many characteristics. Right antenna very slightly pectinated (*not* typically ♀)—Length 8.5mm. Left antenna considerably pectinated (typically ♂)—Length 11mm.

The dark rectangular blotch of the thorax is central anteriorly, but is continued posteriorly on the right side only. Thorax grey laterally on the right side, the dorsal and lateral portions being separated by a whitish streak; left half of thorax uniformly grey.

Abdomen apparently ♀; paler grey on right than on left.

Forewings. Expanse: Right 29mm., left 31mm.

Width: Right 11mm., left 10mm.

Hind margin: Right 15.5mm., left 17mm.

Hind margin less dentated on right than on left. Anal angle more obtuse on right than on left.

Upperside. General colour lighter on right than on left, and pale blotches whiter. Markings more like *populi* on right, and *ocellata* on left.

Underside. Ground colour uniformly dark brown on left, but basal half pale reddish on right.

Hindwings. Expanse: Right 18mm., left 18.5mm.

Right 10.2mm., left 11mm.

Margins equally dentated, but anal angle more pronounced on left than on right.

Upperside. Ground colour lighter on right than on left. Ocellated spot slightly lighter, with much less black surrounding it, on right than on left. Veins lighter and more obvious on right than on left, and reddish basal blotch larger on right than on left.

Underside. Right paler than left.

NOTES ON COLLECTING, Etc.

OCCURRENCE OF *P. c-ALBUM* IN BIRMINGHAM.—On September 3rd I captured a specimen of *Polygonia c-album* in the Rectory garden here. It was in perfect condition, feeding upon a partly decayed apple on the ground. I have not heard of it as occurring in Warwickshire, but we are not far from its known haunts in Hereford and Gloucestershire.—E. GROSE HODGE, The Rectory, Birmingham. September, 1921.

THE IRISH COLONY OF *C. DISPAR*. VAR. *RUTILUS*. A SECOND BROOD.—It may interest those who have followed the fortunes of the "Large Copper" colony in South Ireland since the fateful year 1914 to know that a second brood has produced itself this year as a result of the wonderful weather. The original stock of *Chrysophanus dispar*. var. *rutilus* was brought from the Berlin district in May of that year, and up till now, has proved itself to be strictly single brooded. I have just received information from "The Marsh" that several quite fresh insects were observed on the wing on September 29th and 30th, and 3 ♀ ♀ were observed ovipositing on the latter date. I am of opinion that very late ova may possibly not hatch until the spring.—E. B. PUREFOY, East Farleigh, Kent. October 4th, 1921.

A NOTE FROM MUCKING, ESSEX.—A ♀ *Agrius convolvuli* was brought in on September 21st. I saw a ♂ *Celastrina argiolus* on the 22nd and following days at Sedum flowers, which have also been visited by *Pyraus atalanta*, *Vanessa io*, *Aglais urticae* and *Plusia gamma*. *Pterophorus modactylus* is abundant after dark on the same flowers, which are the only flowers in my garden at the present time. I am not acquainted with visits of *C. argiolus* to flowers except perhaps those of its foodplants, ivy and holly.—C. R. N. BURROWS, Mucking, Essex. September 25th.

CURRENT NOTES AND SHORT NOTICES.

With such a remarkable season as the one now rapidly approaching its close there must have been many abnormal occurrences in insect

economy. Already we have rumours of double even treble broods, unusual scarcity, abnormality in times of appearance, size, marking, etc. May we ask our readers to register such with us in the next few numbers. A black *Papilio machaon* is reported, *Euvanessa antiopa* is about, *Chrysophanus dispar* v. *rutilus* has produced a second brood in its adopted home, and so forth.

Fascicules 3 and 4 of the *Bull. Soc. lepidoptérologique de Genève* for the years 1920 and 1921 have recently been issued. M. Reverdin contributes a short note on *Hesperia syrichtus* and a long article on *Hesperia tessellata*, *Pyrgus montivagus* and *Syrichtus notatus* and M. Arnold Pictet describes his biological observations and experiments with the breeding of *Porthesia similis* at considerable length. There are two plates, one in colour and the other an admirable photographic one of appendages. We note with regret that M. Culot's name is missing. We hear that he has been very ill for some months. About 36 pages are taken up with the "compte rendu" of the meetings.

The Entomological Society of Hampshire and the Isle of Wight was started in 1920 as the Southampton and District Entomological Society; but the membership has so grown, and the words "and District" proved so indefinable, that at a meeting held on October 1st, 1921, it was unanimously agreed to extend the title of the society as indicated above. Meetings are held on the first Saturday afternoon of each month, the present headquarters being at 47, Tennyson Road, Southampton (through the kindness of Mr. W. Fassnidge, M.A., the president); occasional meetings will in future be held in other important centres in the county. A library of entomological works has been started which it is hoped to enlarge considerably next year, and collections of insects are being formed. An important work which the society is at present engaged on is the compilation of a Hampshire Insect Fauna List.

It is earnestly hoped that all keen entomologists in the county and the Isle of Wight will seek membership. There is no entrance fee, but an annual subscription of half a guinea. The honorary secretary is Mr. F. J. Killington, of 1, St. Catherine's Road, Eastleigh.

SOCIETIES.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

April 6th.—ELECTIONS.—Miss J. Riddell, Los Angeles, California, U.S.A.; Mr. C. Dover, The Indian Museum, Calcutta, India; Dr. D. J. Atkinson, Broadoak House, Newnham, Gloucestershire; Mr. L. B. Hopper, Manor House, Penryn, Cornwall; Mr. F. H. Lancum, Fernside, Shepherds Lane, Dartford; Mr. F. D. Coote, 11, Pendle Road, Streatham, S.W.; Mr. H. E. Box, 151, Stamford Hill, N.16; Mr. H. M. Simms, B.Sc., The Farlands, Stourbridge; Mr. H. H. Wallis, M.A., 145, Wilmer Road, Heaton Road, Bradford; Mr. F. Rhodes, 113, Park Row, Heaton Road, Bradford; and the Rev. G. Watkinson, M.A., Woodfield, Hipperholme, nr. Halifax.

—THE EARLY SEASON.—Mr. E. E. Green, remarking on the early appearance of Lepidoptera this season, stated, that an example of *Xanthorhoë fluctuata* had come to light on March 12th; while in

regard to the hibernation of *Pyrameis atalanta* in Britain—a still debated question—he had observed a specimen at sallow on March 17th, at Camberley.

TROPICAL INSECTS.—Mr. C. B. Williams exhibited a case of insects from tropical America, including a *Monodola* species of wasp which buzzed only when digging and spreading mud; and examples of insects distinctive to sugar cane.

LEPIDOPTERA OF THE N.W. FRONTIER.—Lt.-Col. H. D. Peile, a number of interesting Lepidoptera (Rhopalocera) taken on the N.W. Frontier of India, and in N.W. Persia, including a gynandromorphous specimen of *Colias glicia*, and a series of *Zephyrus quercus* var. *mesopotamica* of large size and brilliant purple colouring.

A NEW BRITISH SPECIES OF LEPIDOPTERA.—Mr. J. H. Durrant, a series of *Blastobasis lignea*, Wlsm., including var. *adjustella*, Wlsm., captured in Lancashire, a member of the *Blastobasidae*, a family not hitherto taken in Britain.

PARASITES AND HYPERPARASITES.—The Rev. J. Waterston, examples of *Apanteles americanus*, Lepeletier, and its hyperparasites *Horiomenus nigro-aeneus*, Ashmead; the President said he suspected that the host on which this *Apanteles* was parasitic was *Phlegethontius rustica*.

PAPERS.—The following papers were read: Mr. A. M. Lea, "On some *Chrysomelidae* (Coleoptera) in the British Museum," and Mr. K. G. Blair, "Types of *Heteromera* described by J. Walker in the British Museum."

ANNOUNCEMENTS.—The President announced that the Library was now available for lending books to Fellows, and after a discussion, it was resolved unanimously, that the Society's new rooms at 41, Queens Gate, S.W., should be opened from 5 p.m. to 10 p.m. on the third Wednesdays in the months of April, May, and June, for an informal meeting of Fellows and their friends.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

April 14th, 1921.—**PAPER.**—Miss L. E. Cheeseman read a short paper on "The Parasite of *Sirex gigas*: *Rhyssa persuasoria* (Hym.) and illustrated it with lantern slides. Mr. Edwards exhibited the parasite from both Britain and the Continent.

EARLY STAGES OF COLEOPTERA.—Mr. H. Main, larvæ of *Geotrupes* sp. (Col.), and described their movements and economy.

EARLY APPEARANCES.—Mr. Newman, may in full bloom and reported *Triphaena pronuba* at sallow, March 9th, *Callophrys rubi* on April 10th, and the abundance of *Euchloë cardamines*.

LARVÆ OF A FIRE-FLY.—Mr. Blair, living larvæ of *Photuris pennsylvanica*, a fire-fly of the Eastern United States.

LARVÆ OF AN ACARUS.—Mr. Main, for Mr. Enifer, larvæ of the red mite, *Trombidium*; common in gardens and remarked on its polyphagous habits.

BRED C. VARIABLE (Col.).—Mr. Bunnett, *Callidium variable* (Col.) bred from an oak plank.

April 23th.—**NEW MEMBER.**—Mr. H. L. Dalton, of Reading, was elected a member.

PAPER AND EXHIBITIONS WITH LANTERN SLIDES.—The Rev. J.

Waterston, B.D., B.Sc., gave an address "The Natural History of Macedonia," illustrated with lantern slides and a large number of insects other than Lepidoptera by himself and Mr. K. G. Blair, with additional slides by Dr. Forbes and colour sketches of the scenery by Major Cottam.

CALIFORNIAN LEPIDOPTERA AND THE COCCID *P. ACERIS*.—Mr. Blair exhibited a collection of Lepidoptera sent by Mr. G. B. Pearson from California and also living examples of the Coccid *Phenacorus aceris*, on Spanish Chestnut and Beech, at Oxshott.

May 12th.—AN EXHIBITION OF "OTHER ORDERS."—NEW MEMBER.—Mr. L. N. Staniland, of Muswell Hill, was elected a member.

FOSSIL INSECTS FROM I. OF WIGHT.—Prof. T. D. A. Cockerell exhibited numerous fossil insects from the Mid-Tertiary strata of the Isle of Wight with drawings of new species.

SILK SPUN BY A PARASITIC HYMENOPTERON.—Mr. Lyle, a skein of silk wound from two cocoons of *Meteorus albiditarsis* a hymenopterous parasite on *Bupalus piniperda*.

THE INDIAN MUD-DAUBER WASP.—Mr. Step, nests of *Sceliphron* sp. the Mud-dauber Wasp from Calcutta.

ABNORMAL WALLFLOWERS.—Mr. R. Adkin, a portion of a wallflower of which all the flowers were imperfect in not having a corolla, from his garden at Eastbourne.

NATTER-JACK TOADS FROM SPAIN.—Mr. Barnett, several small "natter-jack" toads from S. Spain.

THE WEST COLLECTION OF ORTHOPTERA.—Mr. S. R. Ashby, the Collection of British Earwigs, Cockroaches, Grasshoppers, Locusts and Crickets, formed by the late Curator, Mr. W. West.

YOUNG OF *M. RELIGIOSA* AND *S. CYLINDRICUM*.—Mr. Withycombe, *Scorpio europeus*, the young stage of *Mantis religiosa*, etc., received from Mr. Hugh Main in the South of France, and also *Sinodendron cylindricum* (Col.), from a decaying beech in Epping Forest.

"APPLE-MOSS."—Mr. Dennis, the "apple-moss," *Bartramia pomiformis*, from Dorking.

NAIROBI INSECTS.—Mr. H. Moore, an exotic Homopteron, *Ptyelus flavescens*, from Nairobi, and also a specimen of *Gongylus gongyloides*, from Ceylon.

T. LAEIVIGATA ON MAY 8TH.—Mr. O. R. Goodman, *Timarcha laeivigata* (Col.), abundant at Horsley on May 8th.

O. SALICIS.—Mr. B. S. Williams, *Orchestes salicis* (Col.), from willow at Finchley.

SKETCHES OF GALLS.—Mr. Coxhead, sketches of galls and their makers.

THE LARGE DRAGONFLY *M. CAERULEATA*.—Mr. Turner, specimens of one of the largest dragonflies, *Mecistogaster caeruleata*, from Central America.

CENTRAL EUROPEAN INSECTS.—Mr. Edwards, a collection of Central European Hymenoptera and Diptera.

INDIAN BIRD-SKINS AND NESTS.—Mr. Grosvenor, a large number of bird-skins obtained by him while stationed in India during 1917-19, mainly from the Punjab, and also a few nests, including that of the Weaver Bird.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

April 18th.—A SPECIAL VISIT AND MEETING.—This meeting was held at the Liverpool School of Tropical Medicine. The members and visitors were received by Professor Robert Newstead, F.R.S., and the staff of the Entomological Department.

NEW MEMBERS.—Miss Jessie L. M. Bird, 4, Riverside Road, Aigburth, Liverpool, and Mr. Herbert Leigh-Lye, Holly Lea, Greenbank Road, Liverpool, were elected members of the Society.

Professor Newstead gave a brief sketch of the work of the Entomological Department since the last visit of the Society. Investigations bearing on questions of public health had been carried out on behalf of the Ministry of Health, and the Port Sanitary and the Public Health Departments of the City of Liverpool. At the request of the Canadian Government, Prof. Newstead had undertaken an examination of the cargoes of grain ships arriving in this port from Canada, for the presence of infestation by the flour mite, *Aleurobius farinosa*, which in suitable conditions does immense damage to flour. During the year an immense amount of systematic work had been carried out. A remarkable new giant scale insect had recently been described by Prof. Newstead as *Aspidoproctus africanus*, from Tanganyika Territory. A very large collection of sand flies (*Phlebotomus*), of which genus at least one species is known to be the carrier of sand-fly fever, had been made by Major A. J. Sinton, V.C., in the North-West Frontier Province of India, and brought to Professor Newstead to be dealt with; some highly interesting facts regarding the distribution of some of the species were mentioned. A very large and important piece of systematic work had been carried out by Mr. H. F. Carter and Drs. A. Ingram and J. W. Scott Macfie, on the blood-sucking midges (*Ceratopogoninae*) of the Gold Coast. A great many new species, representing several different genera, and also a new genus of this family had been described, many being in both the larval and pupal, as well as in the perfect state. In most cases important facts were recorded as to the breeding places and bionomics of the different species. This work is still far from complete, but when finished it will constitute a most important contribution to the literature of this family of tiny but exasperating insects. A new series of Tse-tse fly, *Glossina schwetzi*, had just been described by Prof. Newstead and Miss A. M. Evans. The material had been collected by Dr. J. Schwetz of the Sleeping Sickness Mission of the Belgian Congo, and to him the new fly was dedicated. *Glossina schwetzi* belongs to the group of large Tse-tse flies known as the *fusca* group, the species of which cannot be separated by external characters alone.

The Society inspected the museum, which was not completed on the occasion of their last visit to the School in April, 1920. In the Entomological section of the museum was exhibited material connected with the work that the Professor referred to in his short address. The

collections of biting flies were on view as well as a number of cases of tropical Coleoptera, Hymenoptera, Neuroptera, etc., of general interest. There were also some living examples of the larvæ of the rot-hole breeding mo-quitoes, *Anopheles plumbeus* and *Ochlerotatus geniculatus*, from the district round Liverpool; also adults of *Culex pipiens* and *Anopheles bifurcatus*. The members of the Entomological staff were highly gratified at the very keen interest that their visitors showed in the various exhibits and they well deserved the cordial thanks of the Society. During the evening it was announced that Prof. Newstead's chief assistant, Mr. H. F. Carter, had been appointed Malariologist to the Government of Ceylon, accordingly a resolution congratulating Mr. Carter upon having been chosen for such an important appointment was carried unanimously.

REVIEWS AND NOTICES OF BOOKS.

PROCEEDINGS OF THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, 1920-21, xvi. and 104 pp.—The continued difficulties connected with the printing and block producing trades is responsible for the small size of the present volume. For the first time in its history so far as the writer knows, we might have added to its title, "no illustrations." This trouble is much to be deplored in Natural History publications, considering the importance, frequently the necessity, of figures, in order to make plain the points to which it is desired to called attention.

The Secretary reports a decided gain of membership. The numbers being increased by twenty, as against the five of last year. A considerable addition has been made to the Library by the bequest of the late Mr. W. J. Ashdown, who also bequeathed specimens of "Other Orders" than *Lepidoptera* to the Society's Collections. From the Collections of the late Rev. C. R. Digby, have come also Microlepidoptera, which are a welcome addition. Several other donations of *Lepidoptera*, *Odonata*, *Diptera*, *Hymenoptera* and *Coleoptera* are also mentioned.

Two serious losses by death are recorded. Mr. W. West, one of the original members, and Curator from that time until his death, and present at the Society's Meeting eight days before his death. The other, Mr. G. B. Browne, until the last few years a regular attendant at the meetings.

The Treasurer has reason to be satisfied with the financial condition of the Society, but as long as, owing to its conditions mentioned above, the publication of the *Proceedings* absorbs, 60% of the income, it will be necessary to depend still upon the generosity of the informal Special Committee, whose assistance was acknowledged last year.

The Presidential Address (Mr. K. G. Blair) is devoted to the subject of "Insects of Winter," and deals with the different stages and phases of Hibernation, or winter activity, as the case may be. The Address is furnished with a bibliography of authorities upon the subject.

Only two papers are reproduced "in extenso," doubtless owing to the necessary restriction upon space.

Mr. G. E. Frisby, writes upon "The *Aculeate Hymenoptera* of the British Isles." We have read this with great interest—surprised that

so much information could be compressed into so limited a space. We cannot but hope that Mr. Frisby may be induced to deal with the other section of *Hymenoptera*, *Terebrantia* in the same lucid manner.

The second paper by Dr. Dixey upon "Sexual Dimorphism," is of course, well worth reading and study. This appears to be a continuation of Dr. Dixey's paper upon "Seasonal Dimorphism," read before the Society in 1915 and published in the *Proceedings* of that year. The concluding paragraph in the Paper before us leads us to hope that it also may be succeeded by further notes upon the very interesting subject of Dimorphism in its different forms and features.

In the *Proceedings* proper we notice amongst the various subjects brought before the attention of the meetings, much which would deserve attention, but as usual, space has to be considered. The exhibition and discussion upon the *Hiberniae* was introduced by the Rev. F. M. B. Carr, and illustrated by specimens from his, and other collections. We think that the note by Mr. A. A. W. Buckstone upon the jumping power of the female *H. rupicaprvia* is new. Mr. Bowman contributed a diagnosis of the variation of both sexes of *H. defoliaria*. Another very interesting discussion introduced by Mr. R. T. Bowman, of *Dysstroma* (*Cidaria*) *truncata*, deserves notice, as it contains, it would appear, a freshly observed distinction between this species and its near relation *D. immanata*. Previously the separation relied upon for some years has been the form of the central line upon the hindwing. We presume, although Mr. Bowman does not appear to expressly state it, that his new point of difference refers to the forewing. To this discussion our friend Mr. H. J. Turner has contributed a complete list of the named forms of the species which was the subject of attention.

There is a great deal to be said for these special studies of particular species and we are glad to note that *Calymnia trapezina* and *Hydriomena furcata* were discussed in the same way during the year.

The Annual Exhibition of Varieties was, as noted by the President, a record one, but he mentions rather regretfully, that the show was "to a greater extent than usual confined to Lepidoptera," while Botany would appear to have been entirely unrepresented.

The Field Meetings, as has so often to be recorded owing to our uncertain climate, would appear to have been much interfered with by unsettled weather during the summer of 1920, the most promising in the commencement proving to be the wettest of all in the end.

We notice with interest that the year 1922 marks the Jubilee of the "South London," and that, if our information be correct, there is still to be found amongst its Members just one who joined at its start. We hope that this next year will prove to be a very successful one, both in a largely augmented list of Members and also in a continuation of usefulness and interest in its work.—C.R.N.B.

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Desiderata.—I shall be obliged by gift or loan of a living larva of following species for making drawings for illustrated work on larvæ:—*Minos*, *exulans*, *trifolii*, *melliloti*, *loniceræ*, *caniola*, *deplana*, *griseola*, *lapponaria*, *straminata*, *citraria*, *gilvaria*, *dubitata*, *vitellina*, *concolor*, *cannæ*, *nichitans*, *micacea*, *furva*, *suffusa*, *glareosa*, *rhomboidea*, *gothica*, *gracilis*.—*H. Foster Newey, 14, New Street, Birmingham.*

Desiderata.—*Cratagata*, *Sambucaria*, condition immateria. *Duplicates.*—*Dominula*, *mendica*, and numerous common species.—*E. A. Cockayne, 65, Westbourne Terrace, W. 2.*

Desiderata.—Foreign examples, local races, vars. and abs. from all parts of the world of any butterflies included in the British list. Setting immaterial; exact data indispensable. Liberal return made.—*W. G. Pether, "Thelma," 4, Willow Bridge Road, London, N. 1.*

Duplicates.—*Ethiope*, *Selene*, *T. rubi*, *Phlæas*, *Hectus*, *Perla*, *Chi*, *Nictitans*, *Boreata*, *Cambrica*, *Immanata*, *Olivata*, *Tristata*, *Dotata*, *Pedaria*, *Satyrata*, *Adæquata*, *Mercurella*, *Angustea*, *Dubitalis*, *Ambigualis*, *Decrepitalis*, *Kuehniella*, *Fusca*, *Margarietellus*, *Phryganella*, *Solandrinana*, *Sponsona*, *Rivulana*, *Urticana*, *Aurana*, *Dubitana*, *Herbosana*, *Myllerana*, *Octomaculana*, *Vaccinana*, and *Perlepidana*. *Desiderata.*—Numerous, especially *Tortricina*.—*A. A. Dalglish, 7, Keir Street, Pollokshields, Glasgow.*

Duplicates.—*Aglaia*, *Adippe*, **Io*, *T. quercus*, *Coridon* vars., **Fuliginosa* (Reading), **B. quercus* ♀, *Tiliæ*, *Menthastri*, **Linariata*, *Aurantaria*, *Leucophaearia* vars. *Paniscus*. *Desiderata.*—Pupæ of *Dictæoides*; Imagines of *typhon*, *palpina*, *camelina* (dark), *Curtula*, *Pyra*, and numerous others; Ova of *Hispidaria*.—*Harold B. Williams, 112a, Busham Manor Road, Thornton Heath, Surrey.*

Duplicates.—*Sybilla*, *Paphia*, *Io* (2), *Selene*, *Lucina* (2), *Ocellatus*, *Illustraria* (autumn) *Nastata*, *Roboraria* ♂, *Prunaria* (4) ♂, *Tipuliformis*. *Desiderata.*—*Castreusis* ♂, *Cucullina*, *Cribrum*, *Cinerea*, *Ravida*, *Ashworthii*, *Notata*, *Obfuscaria*, *Smaragdaria* and others, also vars. and local forms.—*Harold E. Winsor, Kent House, Cranleigh.*

Desiderata.—Volumes of *Ent. Mo. Mag.* for 1917, 1918, 1919, 1920; second-hand. State price.—*Hy. J. Turner, 98, Drakefell Road, New Cross, S.E. 14.*

CHANGE OF ADDRESS.—*R. S. Mitford, 24, Bridlington Place, Eastbourne.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7, 8 p.m. October 19th.

The South London Entomological and Natural History Society, *Hibernia Chambers*, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. October 27th; November 10th; November 24th.—*Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.*

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street, E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. *Hon. Sec., W. E. GLEGG, 44, Belfast Road, N. 16.*

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AND

Journal of Variation

EDITED BY

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Three weeks at St. Martin Vésubie (Alpes Maritimes).

By G. T. BETHUNE-BAKER, F.L.S., F.Z.S., F.E.S.

It is a somewhat tiresome journey from la Sainte Baume to St. Martin Vésubie, and I found the easiest way would be to go down to Nans for the night and then catch the early automobile the next morning, leaving at 5 a.m. and arriving at Aubagne in time to catch the 8 o'clock train back to Marseilles, where we were just able to get the express to Nice; here we had to change stations for the single track to Levens, where we again changed to the electric light railway to St. Martin Vésubie. It was a close fit at each place but we fortunately did it and arrived at the Grand Hotel Regina about ten o'clock at night. Here we found Monsieur Piguat ready to welcome us and a nice refreshing meal awaiting our arrival, after which we went thankfully to bed. We arrived here on July 12th and on the afternoon of the 13th began the Fête Nationale with a grandiloquent oration before the mayor and others by the schoolmaster. On the 14th we were awakened early by the strains of the Marseillaise, after which "It's a long way to Tipperary" strikes our ears and so begins a very noisy, and for the villagers, a very exciting day. For myself and indeed my wife also, we preferred the mountain side, but it was impossible and would have been ungrateful to ignore the festivities altogether, nevertheless I thought a walk up to Venanson would be good for my health, and this I took with a most pleasant young Scotsman named Campbell, who with his sister was staying in the same hotel with us, and with whom I made many an excursion.

A brief description of St. Martin may be useful. It has changed considerably in the area of its cultivation since Mr. Rowland Brown was there. The village is situated at the head of the valley in the angle made by the rushing stream descending the Boréon valley and the less impetuous waters coming down from the snows of the Gelas and the Tenestre ranges. The Col de Saint Martin and the Bans de la Frema rise at the head of the valley somewhat on the other side, but wherever one goes in these directions the Italian frontier is soon reached. Since the year 1914 the cultivation of the valley up the hillsides has increased enormously, to-day the hills are terraced far up their sides, wherever it has been possible to get a few yards of more or less level space with the assistance of a supporting wall erected on the spot out of the rocks and stones around, thus the persistence of the French peasants has overcome all obstacles and they have raised their little crops of grain, whatever it may be, wherever it is possible to obtain a foothold. This reclamation of the mountain sides naturally has its drawback for the entomologist as it involves him going much further afield than in the days gone by.

With the exception of the Col. St. Martin and the Bans de la Frema, the most interesting and certainly the most fruitful ground was the valley of la Madone Fenestre and the terrain at the head of that valley, beneath the shadow of the Gelas, and around the Hotel and Refuge. The Boréon valley is however not to be ignored, and the sides of the hills up to Venanson have also their own specialities and need to be well worked. Here as at Ste. Baume we had practically uninterrupted sunshine, but it was certainly a hotter sun than in the Var. Several excursions were made in the Madone Fenestre valley:

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one with Mr. Campbell being particularly interesting and pleasant. We started early, about 8 to 8.40 in the morning on a brilliant day and before 9 a.m. butterflies were well on the wing, the Pierids and *Satyrus actaea* being especially "en evidence" at this hour, this latter species was very common in this valley, all the specimens being of the typical race. The valley is beautifully wooded for the whole distance on the other side, whilst on the sunny side along which runs the generally used path, the mountains rise immediately from the track and are mostly cultivated with an abundance of lavender and various flowers, conspicuous among them as we ascend higher, being *Gentiana lutea*, a very handsome plant with its spikes of yellow blossoms often four feet in height or more. Here I took *Papilio alexanor*, but none of them were really worth keeping as they were evidently nearly over and I only kept one as a remembrance. Here also I took several *Parnassius apollo*, a fairly large race and perhaps a shade darker than the ordinary run of Alpine specimens, a single *Aporia crataegi* fell to my net and I believe I only saw a second one, both being in this valley. *Colias hyale* was far from common, but I obtained one or two fresh and large specimens. *Leptosia sinapis* and *v. diniensis* were captured and *Melitaea didyma* was abundant, the females being very variable. *M. phoebe* was far from abundant, *Argynnis aulais* was of course obtained and also *A. niobe* var. *eris*, whilst I netted but one *Issoria lathonia*. *Melitaea athalia* occurred higher up the valley and was rather dark. Of the *Erebiae* within the valley I only captured *E. stygne*, but near the top, a single fine specimen of *E. goante* fell to my net and in the pastures beyond the Hôtellerie *E. tyndarus* and *E. epiphron* were both fairly common. *Pararge maera* and *P. megera* both occurred, and *Epinephale lycaon* with the band much emphasised, almost *lupinus*, was by no means rare. After *Agriades coridon*, *Polyommatus escheri* was the most abundant "blue" in this valley, *P. icarus* being much less frequent, the only *P. amanda* I saw was also netted on this morning, whilst I took likewise a few *P. hylas*. One or two *Heodes virguareae* were conspicuous in the brilliant sun, the clearness of the atmosphere adding much to the refulgence of their colour, this was the only "copper" I obtained here. Of the genus *Strymon* I netted but one on the Madone side of St. Martin, this being a single male of *S. acaciae*. The genus *Hesperia* was very common in one section of the valley, well beyond the Italian frontier, the species taken were *H. malvodes*, *H. carthami* much the commonest, *H. alveus* and *H. serratulæ*, this latter coming next to *H. carthami* in frequency. We were not sorry to sit down about 12 to 12.30 p.m. to refresh the inner man beside the clear stream which runs round from the Gelas just at the foot of the somewhat sugar-loaf shaped mountain of "la Madone Fenestre," after which my friend was busy photographing whilst I turned my attention to the *Erebiae* and the few other species obtaining in this more elevated and therefore colder spot.

The Venanson slopes produced a somewhat different set of species; for instance the *Satyrus actaea* were of the *cordula* form, many of the females being very handsome with broad yellow fascia and very large ocellations. *S. hermione* occurred here but was difficult to catch, the great heat making them very restless. *Hipparchia semele* also occurred here, though I did not meet with it in the Madone Valley but I imagine it must have been there. *Melitaea didyma* was abundant

everywhere, the females varying from pale straw colour with fair sized spots up to the whole wing being covered with a dusky suffusion; the males were likewise variable, some having the black spots quite small and so showing a large area of bright red. It was on the hillsides on the right of the road to Venanson where I netted the few males of *Polyommatus meleager* that fell to my lot.

In the Boréon valley *Parnassius apollo* occurred and a large well-marked form of *Melitaea phoebe* as also typical *Argynnis niobe*. As we ascended upwards toward the Boréon hotel the usual *Erebiae* were taken and also one torn *E. ligea*, the only one I came across.

By far the most interesting routes however were up to the Col de St. Martin, on to St. Dalmas and from there over the two passes to Venanson on the one hand, and on the other hand to turn sharply to the right from the Col before arriving at the Douane and up to the Bans de la Frema with its green hill at the back; it was here I was able to pick Edelweiss by the handful, much to the envy of many passers by as I returned to the hotel. After one had cleared the few cottages near the Boréon stream that has to be passed over, the ascent up to the Col de St. Martin is made in fairly steep zig-zags over stony ground well covered with lavender and low growing aromatic plants where the Lycænids already referred to were fairly abundant, *Agriades coridon* being by far the commonest and generally of very large size. Here also I took the only females I obtained of *P. meleager*, viz., the form *steerenii*. The only *Aricia medon* (*astrarche*) I took was also from this side. *Plebeius argus* was also taken and likewise *Polyommatus semiargus* (the only *Plebeius argyrognomon*, two specimens, I took in the Madone Fenestre valley). It was up the path much nearer the Col after we had entered the fir tree region, at the end of July, that I took *Polyommatus damon*, and it occurred up to the Bans de la Frema. *Lycæna arion* was nearly over but I took a couple of specimens near the Col de St. Martin. *Strymon spini* was not rare between the Col and the Frema but were past their best; *Heodes virgaureae* occurred here also. Among the first ere the Col was attained I took some large *Satyrus hermione*. *Melanargia galathea*, rather dark and fine large specimens, were likewise common, but I was desirous of pressing on to the heights above, and after arriving at the Italian and joint boundary stones I was glad to ascend the grassy hill above, where in spite of rather a strong wind I found myself among the *Erebiae* and *Melitæae*. I took but one specimen of *E. tyndarus* and of *E. epiphron*, but *E. mnestra* var. *gorgophone* was fairly common though difficult to catch, partly no doubt on account of the wind, however, I succeeded in obtaining sixteen or seventeen good specimens. *Melitaea varia* was not rare here, and I also took one *M. parthenie*; *M. cinxia* occurred a little lower down as also *M. athalia*. The whole of this terrain was interesting country, and had it not been for the scarcity of water I should have made the excursion more than the two or three times I did, but there is only one place where water is obtainable, well below the Frema, and that a rather poor supply, so that even though tomatoes were a good substitute, it was not such comfortable going as elsewhere in the great heat we were fortunate enough to experience. In the lower parts outside the village of St. Martin I took a single *Satyrus circe* and one or two *S. hermione*. *Epinephele lycaon* race *lupinus* were not uncommon. *Coenonympha dorus*

occurred. *C. pamphilus* and one *C. arcania*. I also took two nice *Polygonia egea*, *Pararge maera* and *P. megera*; but one female *Aphantopus hyperantus* and *Epinephele jurtina* were taken. Two specimens only of *Heodes phlaeas* were captured, both of which have the appearance of being laggards of the first brood.

Epinephele tithonus put in its first appearance up towards the Col de St. Martin during the last week of July, whilst one of the most interesting captures, *Erebia neoridas*, a beautifully dark large form, was taken along the same route in the last days of the same month, where also I took *Thymelicus acteon*.

St. Martin is a beautiful centre to stay at and the Grand Hotel Regina a most comfortable place, for Monsieur Pignat and his English wife know what Englishmen like and are ever ready to help and give a hearty welcome.

The fireflies also gave an added charm to the place and I think made my wife at once settle in our preliminary discussions to go there as it was so long since we had seen these fairy lamps flitting about and lighting up the ways. From here we were bound for Digne, as that was our best way to Mount Ventoux where we were to spend the last days of our holiday.

Early stages of *Coleophora ornatipennella*, Hb.

By ALFRED SICH, F.E.S.

On the warm afternoon of May 27th last I was walking beside the river Limmat, near Schlieren, about five miles west of Zurich. There was a bank covered with tall grass, among which *Scabiosa*, *Rhinanthus* and *Salvia pratensis* were plentiful and in blossom. Here *Coleophora ornatipennella* was on the wing in numbers, and I had the good luck to observe two females sitting on calices of *Salvia pratensis*, from which the beautiful purple flowers had fallen. Their bodies were thrust half way into the calices. One of these moths I boxed, and I gathered the two calices and several pieces of *Salvia*, and also took another ♀ moth. Subsequent search revealed an egg in each of the two calices that I had seen used by the moths and many ova were found in the *Salvia* I gathered. One of the captured females laid many eggs in the food plant provided for her.

If we look into a calyx of this *Salvia* soon after the flower has fallen we see four nut-like seed vessels, and below these a pale ochreous portion on which the seed vessels stand upright. This portion I will call the receptacle—I have no English botanical book here. On the lower portion of this receptacle the ovum is laid on its side with the micropylar end uppermost. When first laid it stands out from the receptacle, but later it lies in a depression. This I believe is caused by the strong gum by which the egg adheres preventing the cells of the receptacle which it touches from expanding, while those cells around the ovum expand with the rest of the receptacle. The ovum is of the flat type of *C. caespititiella*, but larger and stronger in the shell, so that it is not so readily pressed out of shape in the process of being laid. In colour very pale ochreous, shining and iridescent. In shape ovoid and slightly flattened, with the micropylar end broader than the other. Rough measurement gives the length as 0.5mm. and the width about 0.3mm., or a little more. Almost smooth, but with irregular surface

pitting. At the micropylar end is a mamilla surrounded by a slight collar. At the time of hatching, about eight or ten days in hot weather, the larva bores through the egg shell and eats its way into the receptacle. The egg shell partly filled with black frass remains attached to the receptacle long after the larva has disappeared inside, and is usually the only sign of the larva's presence in the calyx. In the calyx I have also found a dipterous larva and a gall maker, which distorts the receptacle. The newly hatched larva is of the usual type of this genus, and pale ochreous with a nearly black head. There is a deep brown plate on the prothorax and a small plate on the mesothorax. The larva I think passes nearly all its first stadium in the receptacle, and then enters one of the seed vessels and there changes to the second stadium. On cutting open the receptacle the larva's tracks are plainly visible, and I found one larva in a seed vessel just changing its skin before any of the seed had been eaten. This larva leaves its excrement in its mine. The seed vessel at this time is composed of a thin grey or purplish covering beneath which is a rather hard white shell. In the hollow of this shell the seed lies. By placing her egg on the receptacle the moth provides the larva with an easy, and perhaps the only, means of reaching the interior of the seed vessel. The young larva could not bore through the hard white shell above mentioned, but at the base of the seed vessel, where it rests on the receptacle, there is a hole in the shell closed only by cellular tissue, and here the larva enters easily. The second larval stage is passed inside the seed vessel, whether the larva is content with one seed I am unable to say, but I think it is. The larva in the second instar differs little from that in the first instar, it is of course larger, browner, and I was able to see that it, like *livella*, has four pairs of abdominal prolegs. It feeds on the seed, and if a vessel containing a larva be opened the larva, the partly consumed seed, and an amount of excrement may be seen. When the larva approaches the end of the second stadium it clears the seed vessel of all rubbish and severs it from the plant. The vessel then becomes the larval case, and in it the caterpillar wanders away until it finds some suitable place to which to fix its case. It then undergoes a second change of skin, after which it unfastens its case and crawls away till it finds some convenient situation where it spins up its case firmly with silk, and so remains, I suppose, till the following spring. The larva in its third instar is still browner in colour than in the two previous instars, and the head is brown, but the shields on the thorax remain black. The full sized seed vessel when used as a case is somewhat hemispherical, one face being convex while the opposite one is rather flattened. It is 2mm. long and of nearly the same width, while the depth from back to front is from 1mm. to $1\frac{1}{2}$ mm. They vary a little in size. It is very deep brown in colour, and there are some vein-like marks on the convex side. As a Coleophorid case it differs from any that I have ever seen in that it has only one opening, which is at the top of the case when that is spun up. When the larvæ in their cases began to leave the *Salvia* I provided them with grass, but they did not feed any more and spun up on the grass at the top of their cage, where they still remain. I have searched for these inconspicuous cases in the field on grass stems, *Salvia* stems, and on the earth, but without any success. I presume that the larva, in spring, affixes this case to a blade of grass, and after mining a short time cuts out its well

known case made from a grass leaf, in which it has been found by many entomologists. Though *Salvia pratensis* was strongly suspected to be its first food plant, I believe that the early life of *C. ornaticpennella* has not hitherto been recorded. The species is common round Zurich, as I have found the eggs in several localities. The closely allied *C. lixella* is scarce here according to Frey, and I have been unable to find it. It is supposed to make its first case out of a calyx of thyme. I hope someone in England, where it is common in several places, will soon give an account of its early history, which must differ somewhat from that above described, on account of the small size of the seeds and calyx of thyme as compared with those of *Salvia*.

Seasonal Polymorphism and Races of some European Grypocera and Rhopalocera.

By ROGER VERITY, M.D.

(Continued from page 176.)

Agriades amandus, Schneider; race APENNINOGENITA, mihi; and race BRUTTIA, mihi.—I have tried to work out the geographical variation of this species, to identify and classify series from various localities I possess, but I must say the result is not as satisfactory as in most cases. It is quite noteworthy how in this case there are no characteristics proper to the different regions, permitting one to group the races. The various features do not vary from one race to another in a parallel way, but afford every possible combination, so that one finds no definite line or lines of variation, as in most species. The following notes will show what I mean. I do not know the original description, but Esper informs us he has received a specimen from Schneider himself, collected in the "Swedish provinces" and I infer the Scandinavian race is the nymotypical one. Esper figures a male of a very unusual form, with a brilliant light blue colour and a very thin black streak along the outer margin just as in *icarus*, Rott., but no signs of the usual diffused band; underside darkish grey; orange lunules prominent. Curiously enough, the only race that this figure can be said to represent accurately, amongst those I possess, is the one of the lowest localities of *amandus* in Tuscany, such as the Mt. Conca, m. 400, and other hills near Florence. Rostagno [*Bull. Soc. Zool. Ital.*, xi., p. 53 (1911)] had described this race from the neighbourhood of Rome under the name of *splendida*, comparing it to the Alpine race which he considered nymotypical. Until a series from Scandinavia is available I cannot say whether his name will be of any use or not, but it seems unlikely races of such different climates should be altogether identical. The race which comes nearest to this is *isias*, Frhst. [*Soc. Ent.*, xxv., p. 47 (1910)], from Moulinet, near Mentone, of the same colour, but larger, with a faint and narrow marginal shadow, a much whiter underside and very extensive orange lunules. Similar to it, but with a slightly darker colouring on both surfaces is the race of Polleca, m. 700, in the Aurunci Mts. in Southern Latium. I should next place the race of the high mountains of Central Italy, which I have from Bolognola in the Sibillini, m. 1200, and also, in a slightly darker form, approaching *hispalis*, from Mt. Sumbra, m. 1200, in the Alpi Apuani. In size it is like *splendida*, in colour distinctly darker, being of a deeper and less brilliant blue on upperside and of a

darker grey on underside; female underside colder in tone; lunules paler and smaller in both sexes; I suggest calling it *apenninogenita*. The latter, on the whole, leads up to race *hispalis*, Frhst. (l.c.) from Valais ("Simplon and Martigny") of about the same size, but with very much darker colours both above and below; broad black marginal band, lunules very pale and inconspicuous on underside of male, small on both surfaces in female. We then have the fine *libisonis*, Frhst. [*Soc. Ent.*, xxv., p. 97 (1911)] from "Klausen and Waidbruck," in S. Tyrol, which I have also collected at the Erdpyramiden, m. 1400, near Klobenstein, and at the Mendel Pass. It is even larger than *isias*, of a slightly lighter colour than *hispalis* on both surfaces, but with a still broader black marginal band above; larger lunules below. Finally there is the race found by Querci at S. Fili, on the Coast Range of Calabria, which usually resembles *hispalis*, except for a very peculiar greenish tinge of the blue and a broader and darker black marginal band than in any of the other races; a few individuals are as large as *libisonis*; some are brighter blue above than the rest and have a lighter tinge of grey on underside and large bright lunules, thus showing signs of transition to *splendida*; I should call the S. Fili race *bruttia*. An attempt to summarise the geographical variation of *amandus* is reduced to noting that at low altitudes one finds the light, clear blue forms, with no dark marginal shading or a faint and narrow one (Mentone, Florence, and presumably, if Esper's figure is correct, Scandinavia), and that at higher altitudes the colour is darker on both surfaces and there exists a broader and darker marginal band; the latter form, however, in S. Tyrol, comes down as low as the Isarco Valley and is of large size. These lines of variation correspond, in a broad way, to those of *Cyaniris semiargus*, Rott.

Agriades coridon, Poda, race CAELESTISSIMA, mihi, and *A. hispana*, H.-S. (= *aragonensis*, Vrtý.), race *hispana*, H.-S., first generation PRIOR, mihi.—During a visit I paid Count Turati last June in Milan I took the occasion to ask him to show me his copy of Herrich-Schäffer's *Syst. Bearb. der Schmett.*, and I examined the figures of *hispana*. I thus found out that it did not in the least represent the bright blue race of *coridon* from Spain, so similar to race *caucasica*, Led., in being of nearly the same blue as *A. thetis*, Rott., as I had till then supposed, but that *hispana* is remarkably similar to the second generation *altera*, Vrtý., of the species I called *A. aragonensis* race *florentina*, Vrtý., from Tuscany: upperside pale greenish blue; underside of hindwings pale tawny. The consequence is that this species should be called by the older name of *hispana*. The first generation, of a slightly brighter blue above, as a rule, and with no tawny colour on underside, I propose calling *prior*. I possess Spanish specimens of the first brood from Valevidrera (Barcelona) and others of the second from Valdemoro (Nueva Castilla), the former of which are indistinguishable from the Florentine *florentina* and the latter from the Genoese larger and more boldly marked *rezniceki*, Bartel. There is thus no doubt that H.-S.'s specimen was of this sort. Gerhard's *aragonensis* is, specifically speaking, a synonym of it, but, as regards races, it clearly represents a different one, larger, silvery white instead of greenish-blue, with very prominent, but detached, premarginal spots and lunules on upperside and a more

extensive pattern also on underside; of this I have specimens generously presented to me by Dr. Chapman, who has himself collected them at Albarracin (Aragon) in July and August. Dealing with these species, I must thus also conclude that, strangely enough, the beautiful *thetis*-coloured race of *coridon* from Spain, mentioned above, has to this day remained without a name; I suggest that of *coelestissima*, taking as "types" the specimens, sent to me by Chapman, from Albarracin and from Tragacete. I have others, from Valdemoro and from Cuenca in Nueva Castilla, all exactly alike. I have also received from Cuenca the totally different *albicans*, H.S., which makes one suspect that the existence of a third species in Spain might some day be established; *albicans* is usually quite a *coridon*, but in some individuals it approaches the look of *aragonensis*, Gerh., so much that an untrained eye would no doubt mix them together. The specimens collected by Chapman at Avila and Navalperal are of this sort, whereas those of Cuenca usually never are. Some day I must come back to this subject more at length. I will only mention here the quite peculiar underside of *albicans*: ground-colour dirty white on all the wings, with a suspicion of yellow; markings not black, but brown, very pale in extreme forms; lunules not orange, but dirty yellow, usually extremely small, often totally obliterated. Individual variation leads from this special form to the usual bolder pattern and colouring of *coridon* on the one hand, such as in my large series from Cuenca, and of *hispana* and *aragonensis* on the other in some examples, such as those of Chapman mentioned above; in the latter cases, however, complete transition does not exist. Recapitulating, one comes to the conclusion that in Spain *A. coridon* and *A. hispana*, apart from minor local differences, both produce a smaller blue race (respectively *coelestissima* and nymotypical *hispana*), and a larger silvery-white race (*albicans* and *aragonensis*).

Aporia crataegi, L., race *angusta*, Trti., trans. ad race *crataegi*, L. —The race found by Querci at S. Fili, m. 900, on the Calabrian Coast Range, is interesting, because its variations exhibit a direct transition from the very characteristic *angusta*, Trti., of Sicily, to the nymotypical race of the species, whereas not one individual form of Calabria is similar to *meridionalis*, Vrt., which prevails largely in Central Italy. In the characteristic individuals of the latter there is in the male a complete disappearance of black scaling along the neurulation on both surfaces and of the sparse scaling of underside, and in the female the forewings are nearly entirely transparent, with a few white scales near apex only. Instead in the race in question the whitest males always show as much black scaling as the whitest individuals of Central Europe; the most transparent females always have the outer half of forewings white; along the discocellular nervules of both fore and hindwing a more or less conspicuous irregular patch of pale grey is visible in this sex; these never exist in *meridionalis*, whereas they are a characteristic of the Linnean race (see "*Rhopalocera Palaearctica*"); in one specimen this patch has the form of a broad quadrangular spot on forewing, even more pronounced than in race *sibirica*, Vrt. In the male specimens from Calabria, in which the black scaling is most extensive, this never develops in the broad, triangular and partly confluent grey

marginal spaces of the Linnean race nor in the deep black, long, sharp nervural streaks of *augusta*, but individuals distinctly pointing to both these extreme forms are to be seen. *A. crataegi* thus follows the rule which is frequent in Calabria, its race being much more similar to those of Central Europe than to its neighbours of Central Italy.

(To be continued.)

Collecting in Palestine in March, 1921.

By MAJOR P. P. GRAVES, F.E.S.

During March this year I was convalescing, after a serious illness, in Palestine, and had a chance of a few days collecting on two occasions—on Mount Carmel from March 5th to March 11th, and at Jericho from March 17th to March 22nd. I also had a few hours collecting at the end of March at Kolonia and Ain Karim near Jerusalem, and Urtas near Bethlehem, but found little at these localities.

Mount Carmel struck me as a good collecting ground, but not many species were yet out there. On my way to Palestine I had spent 2 days at Beirut and got in an hour's collecting on March 3rd at the Dog River, Beirut. Here I took *Pieris brassicae*, *P. rapae* v. *vaga*, a small race, *Pararge aegeria* somewhat worn, and four ♂s of the spring form of *P. napi* v. *pseudorapae*, which is the second (summer) brood of *P. napi* at Beirut. They are small specimens without much dark scaling on the apex, or on the marginal extremities of the nervures of the forewings. On the hindwings the dark scaling on the marginal extremities of the nervures is faint, much fainter than is the case with most vernal specimens from Constantinople. On the underside the subapical and submarginal spots on the forewing are also very faint. The ground colour of the hindwing is a very pale washy yellow: the dark scaling along the nervures is very diffuse, giving a clouded appearance to parts of the wing. I refrain at present from naming this form. Four specimens of one sex hardly justify an addition to the many names already bestowed on the many forms of *P. napi*. I saw and missed specimens of *Pararge maera* v. *orientalis* and *G. cleopatra* v. *taurica*.

At Haifa itself *P. rapae* flying in kitchen gardens was the only insect I saw. On Mount Carmel the one abundant butterfly was *Euchloë cardamines* race *phoenissa*, Kalchberg, which occurred in considerable numbers in all the ravines which seam the southern face of the mountain, and also, though less frequently, in the pine plantations at the summit of the ridge nearest to Haifa. Of 26 ♂s in my series 11 are *turritis* and 13 approach *umbrosa*, Culot, more or less closely, in having the basad margin of the orange area on the upper-side forewings marked by dark scaling. The ♀s are generally distinguished by having in the spaces between the nervures within the grey apical area white, more or less triangular, markings based upon the outer and apico-costal margins. The ♀s began to appear on March 6th and were not infrequent by the 11th. Other Pierids seen and taken were *Pieris brassicae* in small numbers, *Anthocharis belemia*, 4 ♂s and 1 ♀ of first brood form, and *Gonepteryx cleopatra* race *taurica*, which was not infrequent. *Pyrameis atalanta* and *P. cardui*, the latter worn, occurred occasionally. The only Satyrid seen was

Pararge maera, of which I took 1 ♂ and 2 ♀s all fresh and of the race *orientalis*. *Doritis apollinus* was not uncommon, but in bad order. Two *Papilio machaon* were seen on the 11th. Of the *Lycænids* I saw and took *Polyommatus icarus* on March 8th, and 1 ♂ *Scolitantides* (*Turania*) *baton* approaching *clara* on the 11th. Jerusalem, where I went on the 12th was icy cold, so I was glad to get down to Jericho on the 16th. On the 17th I started out early collecting, working the downs and the edge of the cultivation to the N.W. of the village and the lower slopes of the hills. At 8.25 I put up and caught my first *Anthocharis charlonia*.

Later on butterflies began to appear more freely, notably *A. charlonia*. This species usually settled on the ground and when disturbed flew rather low in a series of small circles. This habit of flight was so marked that I soon learnt to catch the butterfly with the minimum of exertion by simply swinging round in the opposite direction to the insect's flight meeting it with the net when it had completed a half circle. ♀s of *A. charlonia* were rare. I only took 2 that day against 16 ♂s. *Pontia daplidice*, large but otherwise fairly typical, was abundant, and even more abundant was *A. belemia* var. *glauce*. A few *P. rapae* of a large race were taken on the edge of the cultivation. Then in a bay of flowery wild ground invading the cultivation I took a fine ♀ *Danaüs chrysippus*, the only one I saw in Palestine. Next I took *Tarucus balcanicus* flying round *Paliurus* scrub. Then I worked slowly as befitted an invalid towards a gully which emerged from the hills taking *P. icarus* of very normal Mediterranean first brood form and *Rumicia phlaeas* on the way. In the gully I found *P. brassicae* in bad order, and *Pyrameis cardui* and then saw a large white butterfly, the flight of which was strange to me. After a while it settled on a flower-head and I saw that it was a fine ♂ *Zegris eupheme*. I caught it and others, though few required as little stalking as the first specimen. Two fine second brood *Anthocharis crameri* of a form both larger than and unlike *aegyptiaca*, *Verity*, and *melisanda*, Frühst., were taken in this gully. I saw no more during my stay at Jericho and suppose I was early for the second brood. As I returned to Jericho I took the only Satyrid I saw in Judæa or the Jordan Valley, a very fresh *Ypthima asterope*, and the only Urbicolid I saw in Palestine, a passable specimen of *Erynnis alceae*. During the morning I took 82 specimens of butterflies in about 3½ hours—a good bag for an invalid who dared not run—and including 18 *A. charlonia* and 9 *Z. eupheme*; both new species to me.

Next day I worked the same ground but showers and cloudy weather were too much for the butterflies. Still I took 2 *Z. eupheme*, several *E. charlonia* ♂s, and an unfortunately crippled *P. icarus* ♀ with abundant blue suffusion. On March 19th and 20th it rained. On the 21st it was fairly fine and I returned to the old ground, took *P. brassicae* (seeing a damaged ab. *nigronotata*, Jach.), *A. charlonia*, *A. belemia* var. *glauce*, several *R. phlaeas* all pretty normal first brood specimens, 1 *Lampides boeticus* and 5 *Z. eupheme* including 2 ♀s. *Pontia daplidice* was common. I saw a fine *P. machaon* and some worn *Colias edusa*.

Next day I visited the Jordan and saw *A. belemia* var. *glauce* and *P. cardui* in the thickets by the river. That night I motored to Jerusalem. On March 24th I saw *P. brassicae* at Jerusalem. Next

day I had a couple of hours collecting at Kolonia in dull weather. There I found a few *Thais cerisyi* including one or two very small specimens. The local *T. cerisyi* race seemed with few exceptions much nearer to *deyrollei* than to the nymotypical form. A few *Doritis apollinus*, *E. cardamines*, *A. crameri* ♀s, and a fine ♀ of *A. belemia* (1st brood) were taken and *P. icarus* and *P. brassicae* seen. On March 26th I had a few minutes collecting by the roadside near Ainkarim and took *D. apollinus* and *E. cardamines* var. *phoenissa*. On the 28th I took all the species noted on the 24th near Bethlehem, my best capture being a dwarf ♂ *E. cardamines* race *phoenissa* of 22mm. in expanse. On the 31st I had about half an hour at Kolonia and took most of the insects seen on the 24th with a ♀ *R. phlaeas* and a fine ♂ *S. (T.) baton* var. *clara*. Here, as elsewhere on the Judæan plateau insects were not nearly as frequent as at Mt. Carmel or Jericho, but spring had barely begun and I could not have expected much in any case.

† May I add that a late autumn-brood of *A. charltonia* appears at Jericho in November, *teste* specimens in the collection of the Ministry of Agriculture, Cairo.

The French Jura in June-July, 1920.

By Lt. E. B. ASHBY, F.E.S., and Member Soc. Ent. de France.

Leaving London on Friday morning, June 25th, and travelling *via* Newhaven, Dieppe, Paris, and Bourg, I arrived early on the morning of June 26th at Bellegarde. Having three hours to spare before the only train this month left for Gex, I explored the fine waterfall, La Perte du Rhône, a short distance from Bellegarde station. Climbing up through the woods on the left bank of the Rhône, I came out at the top into a meadow of partly cut hay-grass.

Here I found *Melanargia galathea* in large numbers and good condition, together with *Epinephela jurtina* and a specimen or two of *Cyaniris semiargus* (*acis*) and *Lycaena arion*, and *Polyommatus icarus* in perfect condition; a few of the Neuropteran *Ascalaphus longicornis* were flying to and fro, whilst *Zygæna filipendulae* and *Z. lonicerae* were swarming at the flowers of *Scabiosa succisa*.

A good number of the beetles *Curculio* (*Hylobius*) *abietis*, L., were dashing about in the hot sun, and I took one specimen also of the pretty beetle, *Olythra laeviuscula*, Ratz.; but the interest of the meadow centred in the Orthoptera which swarmed in the uncut grass. From this I turned out a male and female of the sluggish green grasshopper with long antennæ, fat body, well developed green elytra, with a row of black spots, the Orthopteron *Decticus verrucivorus*, L.

I also turned out two fine males of the grasshopper, whose dark olive body, yellowish antennæ tipped with black, crimson hinder tibiae and tarsi, with a yellow basal ring; hinder femora yellowish above, green outside, crimson inside and underneath, with a yellow annulus near apex; yellow venter and hinder knees quite black in both sexes, smoky blackish wings and chestnut elytra with yellowish anal area, proclaim them *Arcyptera fusca*, Pallas.

I also secured here two males of the *Staurodernus scalaris*, F.W.; I also took a larva of the genus *Chelidoptera*, but I have not succeeded in ascertaining the species. Here also I

took a specimen of the Forester Moth, *Ino geryon*, whose greenish forewings gleamed in the bright sun, a noticeable contrast to the green grass.

A specimen of the Hymenopteron *Metopius micratorius* had entered our carriage between Culoz and Bellegarde this morning, and a French officer having pointed it out to me I boxed it in the corridor of the train.

Leaving Bellegarde at 11.25 a.m., I arrived after a hot, slow, and tedious journey at Gex, in the Department Ain, and situated below the slopes of the French Jura, about 2.0 p.m.; the view of the Grand Salève, and the Petit Salève, and Les Voirons, and the Mont Blanc range behind is very fine, and could be seen from our carriage windows most of the journey. I put up at the Hotel du Commerce at Gex, which I found respectable, clean, and cheaper than I expected, and well served.

June 27th.—This morning after Mass at the Parish Church, I had the pleasure of meeting Doctor Gide, who lives at Gex, and who has a small though extremely well set collection of the local butterflies and moths. One of the most interesting things in his collection was a perfectly fresh specimen of *Carterocephalus palaemon* (*paniscus*), caught around Gex in May. I don't think he has by any means exhausted the local fauna as yet, and he told me he had very little time to devote to Entomology. This afternoon I took a country road from Gex that leads up gradually through farms on to the lower slopes of the Juras, which are quite close here. Unfortunately the sun soon went in, and I came home drenched from a sudden thunderstorm, but though my insects captured only resulted in a few perfect specimens of *Melitaea athalia* and *M. didyma*, a few *Cupido minimus*, *M. galathea*, and a fine blue female of *P. icarus* ab. *caerulea*, Fuchs, a finely marked female of *Pieris napi*, together with the Chimney-Sweep Moth and *Pyrausta purpuralis*; the Dipteran *Tachina ferox*; and the Rhynchota *Leptopterna dolabrata*, L., I feel sure that a better day would have given better results, especially if I had been able to ascend to higher ground. However, a collection of some 45 different species of flowers made up for a poor entomological bag.

June 28th.—This morning, with no sun, but with insects of all orders crowding to the blossoms and leaves of many plants fresh with the heavy rain of yesterday, a little way out of Gex, in the direction which the road to the Col de la Faucille takes, amid partly cut hay in the fields below the Jura slopes, I found the males of the moth, *Coscinia striata* in numbers and very fresh; one fine male of *Papilio machaon*, two fine males and one finely marked female of *Polyommatus hylas*, and one female of *A. aglaia*, with a few picked specimens of *C. minimus* and *M. athalia* were the most interesting butterflies on this sunless day, but a number of Diptera, including *Sphaerophoria*; Orthoptera, including *Chorthippus parallelus*, Zett., a larva of the genus *Pholidoptera*, whose species I have not succeeded in ascertaining, also a male of *Decticus verrucivorus*, L., and some Hymenoptera. These, together with a specimen of the Rhynchota, *Syromastus marginatus*, L., provided plenty of research on my return home.

In the afternoon I visited the same ground as in the morning, and found that *P. hylas* males were more numerous, and I took one female.

Ascending to higher ground I found *Nordmannia* (*Thecla*) *ilicis* on

privet, also *Klugia spini* on bramble. Higher up still, just by the tree limit on the Jura slopes, I took two fine *Parnassius apollo* males, and saw one or two *Erebia euryale* and *Pararge aethina*, but failed to secure them. The Diptera were interesting though somewhat hostile. The afternoon turned out very fine after a dull day in general. *Argynnis aglaja* were swarming at clover blossoms, with *A. cydippe* (*adippe*) in lesser numbers, and I also took several perfect specimens of *M. parthenie* and one *Lycaena euphemus*, the only one I saw. Females of *Colias hyale* were busy ovipositing in clover-fields in the late afternoon. Burnet Moths in general and *Aporia crataegi* were too *passés* to take. *E. jurtina* and *C. pamphilus* were in all stages of condition, and the three common Pierids plentiful in the district. I turned up a fine large green form of the grasshopper, *Decticus verrucivorus*, L., from newly cut hay, and the Orthopteron, *Locusta viridissima*, L., was in great quantity in suitable places. *Leptosia sinapis* was apparently just emerging here. *Aglais urticae* was common.

June 29th.—This morning I tramped the six kilometers to Sauverny in which village the Swiss and French frontiers meet at the river Versoix. I went there for *Limenitis populi*, but never saw it, though I got on to likely ground once about half way to Sauverny, where, on a branch road running past a chateau on left, and keeping to the right of a small stream, I walked up a small incline, where *Apatura ilia* and *E. polychloros* were flying up and down the muddy road in small numbers, and sipping at the puddles with swarms of *P. rapae* and *Cyaniris semiargus* (*acis*). Just across the stream mentioned, near the chateau, I found in a sloping meadow with a considerable amount of rush, a good number of *L. arion*, males and females, in excellent condition, and I took a fine series. The males of *P. damon* were emerging in small quantities in the same field, and the males of *P. hylas* were frequent.

Here also I took the moth *A. luctuosa* and two specimens of *Pseudoterpna pruinata*, Hüfn., *Nordmannia* (*Thecla*) *acaciae*, Fabr., and also one specimen of *Tenthredella temula*, Scop. On the way back from Sauverny I took *C. typhon* (one), and also a male of *Pontia daplidice*. *M. didyma* and *M. dictynna* were about in small quantities. I took also one male of *Cupido sebris* in very fair condition, and a specimen of the beetle *Strangalia armata*, Herbst., also one female of *P. hylas*, and a specimen of the beetle *Coccinella septempunctata*. I also took to-day a female specimen of the Orthopteron *Decticus verrucivorus*, L., and the bee *Bombus sylvarum*, and a couple of the ants *Formica pratensis*.

June 30th.—This afternoon a French gentleman, Monsieur A. Morey, of Beaune, Côte D'Or, staying at this hotel, kindly motored me to the Col de la Faucille, where, unhappily, it began to rain so hard that collecting insects was impossible, barring two specimens of Hymenoptera, *Bombus hortorum* and *Allantus köhleri*, which I got just before returning during an interval in the storm. However, I made a collection of some 40 different species of sub-alpine flowers, including a few Alpine forms, amongst these plants were *Hedysarum obscurum*, *Ranunculus alpestris*, *Dianthus sylvestris*, *Rosa alpina*, *Gymnadenia albida*, *Carduus defloratus*, *Centaurea montana*, *Cytisus alpinus*, *Calamintha alpina*, *Adenostyles alpina*, *Globularia cordifolia*, *Phyteuma spicatum*, *Myosotis alpestris*, *Ranunculus lanuginosus*, etc.

July 1st.—This morning I took a ramble on the wooded hillside of

the Juras just above Gex, as on the afternoon of June 28th, and added the following species to those already named for this locality, *viz.*, *L. arion* (one), *Hesperia sao* (two), *Erebia ligea*, *K. spini*, female; an interesting beetle, *Cicindela hybrida*, L., with greenish head and body and four white markings on each side and a little white marking close by its antennæ, *Hipparchia semele*, and *Hesperia alveus*. I saw *P. achine* again, but failed to take it. *P. apollo* was about but not in any numbers, the sun being obscured frequently. I also took one specimen of the pretty beetle *Cryptocephalus aureolus*, Suf. In returning, near the village of Gex, I took a fine form of *Polygonia c-album*, and I noted *A. urticae* and *G. rhamni* by the gardens.

In the afternoon Monsieur A. Morey again kindly motored me the 12 kilometers to the Col de la Faucille and back. Stopping to collect in a suitable place below the summit I found the Wood Tiger Moth, *Parasemia plantaginis* swarming with some nice varieties. *P. apollo*, *E. euryale*, *E. ligea*, *E. aethiops*, and *E. oeme*, were about in pretty equal numbers. I got one *A. crataegi* still worth setting, also three females of *Chrysophanus hippothoe* near the summit in excellent condition, and the bee *Bombus agrorum*. A good many moths were about, including the black Chimney Sweep, *Tanagra atrata*; the black and yellow little moth *Psodos quadrifaria*; no Burnets were worth taking. I also got the two moths *Mamestra dentina* and *Crambus pinetellus*, and a female specimen of the Hymenopteron *Megalodontes spasicornis*. I did not go higher than the Hotel at the Col, as the afternoon was waning, and therefore I do not know whether the higher altitudes would produce more at this date. *A. hyperantus* and *C. iphis* were abundant where I commenced to collect this afternoon, but the latter needed careful selection as the majority were in poor condition. I also got one fine specimen of the moth *Carsia praeformata*, Hübner.

July 2nd.—Accompanied by my friend, Doctor Gide, of Gex, I was able to pass the Swiss frontier at Sauverny without passports, etc., and we searched the ground on the high road from Sauverny to Versoix, between two large woods, suitable ground for *Apaturidae*. It was too late in the day to get them on the road, and it was not until about 4 p.m. that I saw a female and a male of *Apatura iris* settling on the tops of willows just inside the wood. I got them both, together with a very fresh *Hemaris bombyliiformis*, Och. (the narrow-bordered Bee Hawk Moth), on flower heads, and a female specimen of the Dragon-fly, *Sympetrum scoticum*. Nothing much else was about. I saw nothing of *L. populi* in this district, where it should occur, but was probably too late for it this year of early emergences.

Staying the night at Sauverny I again crossed the frontier next morning.

July 3rd.—Only one male of *A. iris* fell to my net at 8 a.m., all hopes of a good bag being dissipated by a violent storm of wind and rain which lasted until midday. In the afternoon, on the way back from Sauverny to Gex, the weather recovering, I again visited the *L. arion* ground described under June 29th, and got another bag of good specimens of both sexes, and a male of *C. semiargus (acis)* quite fresh. A few fresh males of *C. hyale* and *M. didyma* (small form) were about, and I was pleased to take the first Burnet in good condition that I had seen here, *viz.*, *Zygaena ephialtes*, var. *pencedani*, Esp., with the pretty red band around its body, and also one specimen of *Zygaena lonicerae*,

Esp., together with a specimen of the Neuropteran *Hydropsyche pellucidula*, Curt.

I omitted to mention that this morning about 8 a.m. I got a fine female of the Orthopteron *Gryllus campestris*, L., also a specimen of the beetle *Hoplia philanthus*, Fuess., on the road between Sauverny and Versoix.

July 4th.—I left Gex to-day for Annemasse in Haute-Savoie, and my collecting in that neighbourhood among the French Alps will form the subject of a further article.

NOTES ON COLLECTING, Etc.

A NOTE FROM CONSTANTINOPLE.—A THIRD BROOD OF *P. CHLORIDICE*.—I have not had over much time for collecting here lately. *Pontia chloridice* produced a third brood in September. The season has been very dry till lately. I have been trying to sugar the last fortnight—results one *Plusia gamma* and one *Leucania* in bad order. This is the suburbs—but still it does not say much for the attractiveness of sugar here.—P. P. GRAVES. October 6th.

SECOND BROOD OF *PARASEMIA PLANTAGINIS*.—*P. plantaginis* was common on the grassy open slopes near Lulworth Cove, in Dorset, and particularly active on the wing at sundown. I think that there can be little doubt that this was a second brood, though I was not there to observe any flight in May and June. From two of these females I now have many small caterpillars who have cast their second skin.—M. BOLDERO, 57, Elm Park Gardens, S.W. October 11th.

TERATOLOGICAL SPECIMENS.—Mr. G. B. Pearson, of Pasadena, S. California, writes to say that a friend who collects largely on the Pacific Coast of California has recently caught a specimen of the beautiful little “blue” *exilis*, with five perfect wings, the right upper wing being duplicated. This latter gentleman possesses a fivewinged example of the Saturniid *Samia cecropia*.—HY. J. T.

A LOCUST AT MANSFIELD.—A friend of mine has had a fine specimen of the locust, *Pachytylus migratorius* given to him. A man heard it making a rustling noise amongst his cabbages, and when it was disturbed it took to flight, but he managed to knock it down with his cap. This was on September 25th, 1921.—WILLIAM DAWS. October, 1921.

NOTES FROM NORTH NOTTS.—After great promise, according to the number of larvæ feeding in the woods in spring, it was almost a failure later on with the imagines in this district. There were thousands of the common species of larvæ feeding on the various forest trees. But I did not collect any, intending to get them when about full fed, but before my next visit we had a lot of wet weather, in fact some very heavy rain storms, which washed off most of the larvæ from their food plants. *Pieris brassicae* and *P. rapae* have been fairly common all the season, *Rumicia phlaeas*, *Coenonympha pamphilus* and *Polyommatus icarus* were also common. I did not see a single batch of *Aglais urticae* larvæ this season, but a few imagines are now on the wing, also one or

two *Pyrameis cardui*. *P. atalanta* is now on the wing in rather larger numbers than last season.

I have bred over 200 *Arctia caja*, the second brood this season, but only had four or five worth setting; one had the white of the top wings more extended, a pretty form, one with a different pattern on each top wing, and one with each underwing of a different pattern. I have a number of ova, the third brood, which are fertile, and are turning dark coloured and will no doubt hatch directly, but I hope they will all hibernate, as I do not want the trouble to feed them up this winter. About the best specimen I have put in my collection this season from local species is a black *Boarmia rhomboidaria*. It was found by my wife resting on the wall at the back of the house, where the Virginia Creeper grows on the wall—the larvæ of *B. rhomboidaria* for several seasons have fed on the creeper.—WILLIAM DAWS, 39, Wood Street, Mansfield, Notts. October, 1921.

M. ATROPOS NEAR WEYMOUTH.—On October 15th, a very fine and perfect specimen of *Manduca (Acherontia) atropos* was brought to me alive, captured at Rodwell, Weymouth, Dorset.—(Commander) J. C. WOODWARD, H.M.S. Colossus, Portland. October 22nd.

THE PAUCITY OF BUTTERFLIES IN THE PAST SUMMER.—The paucity of butterflies (locally at least) this past season was remarkable. Even of the commonest species few were to be seen. The first appearance noted of a few of them may be of some interest. The first butterfly observed was *Pieris rapae*, on March 24th. *Gonepteryx rhamni* the next day was seen flying in the street; *Euchloë cardamines* commonly on April 28th; one *Colias croceus (edusa)* on July 9th; *Limenitis sibilla* on July 11th, *Pyrameis cardui*, one in the garden August 1st. One special feature of the season, however, in contrast generally with the scarcity of the rest was the abundance of *Rumicia (Chrysophanus) phlaeas*. These made a delightful sight as they flitted over, and settled on, the gaily coloured flowers in the borders of the garden, flashing like specks of copper in the sunshine.—JOSEPH ANDERSON, Chichester.

SILEX GIGAS AT CHICHESTER.—The largest specimen (a female) of this giant sawfly was taken here on August 6th. The insect is generally to be found in this locality each year.—JOSEPH ANDERSON, Chichester.

THE MOSQUITO INVESTIGATION.—The Committee of the South-Eastern Union of Scientific Societies on the above have just issued, under the auspices of the Ministry of Health, their circular No. 5, in which they state that "The researches following upon the issue of Circular No. 4 established still further the fact that the species (*Anopheles plumbeus*) is found extensively distributed throughout the south-eastern area of England. In some districts all stages have been found, in others only larvæ and imagines; that it hibernates as partly grown larvæ, mainly in tree holes of beech, birch, chestnut, and holly; and that imagines are found in every season of the year except winter." The Minister of Health, in acknowledging the Committee's second report on *Anopheles plumbeus*, desires a further report as to "any curtailment of distribution or decrease in numbers of the species that may have been caused by the severe drought of the past summer." The Committee now want definite information—

1. Of any records of the captures of adult *A. plumbeus* since June 30th last, with dates.

2. What was the condition, during the recent drought, of the water in tree holes from which larvæ had been taken in previous seasons?

3. Were living larvæ found in such holes on the occasion of any visits during that period?

4. Were larvæ found there when you again visited the holes this autumn?

5. Does *A. plumbeus* deposit her eggs (a) on the water, (b) on floating or stationary matter, (c) on the wet margins of the water holes?

6. Can the eggs be hatched after becoming dry? If so, how long after, in your experience, do they retain their vitality?

7. Any other observation that may occur to you bearing on the possible hibernation of the species in the egg stage?

Answers to the above queries should be sent to the Hon. Secretary, Rev. T. W. Oswald-Hicks, B.A., "Lesware," Linden Road, West Green, London, N. 15, not later than December 1st. It is hoped that as many as possible will send information for this further report which the Committee are to make by the new year.

SECOND BROOD OF *O. sambucaria*.—A freshly emerged specimen of *Ourapteryx sambucata* came to light this evening. Though second broods of this species are not unrecorded they are, I think, very unusual, and possibly the occurrence may be worth noting in the *Record* amongst other second broods of this abnormal year.—H. C. HAYWARD, Repton, Derby. *October 20th*.

VANESSIDÆ, ETC., IN EAST TYRONE IN 1921.—A special feature of this autumn has been the wonderful abundance of the *Vanessidæ* in this district. *Pyrameis atalanta* was everywhere and is still (October 19th) common, flying about ivy in bloom; *P. cardui* was also abundant during September, but had disappeared before the end of the month: a fine male was taken with the posterior wings almost black. *Vanessa io* and *Aglais urticae* were also much in evidence. *Pararge aegeria*, which was first noted on the wing at the end of March, has produced at least four broods this season, and to-day a freshly emerged female was observed drying its wings suspended to a blade of grass in the garden.—THOMAS GREER, Curglasson, Stewartstown, Co. Tyrone. *October 20th*, 1921.

NOTES ON *CELASTRINA ARGHOLUS*.—Referring to Mr. Burrows' note of this species frequenting the flowers of *Sedum*, I may say that I have taken it at Hazeleigh (Essex) more than once on flowers of the wild bluebell (*Scilla nutans*), and also have the following records for the same locality:—A very worn female on borage flowers, on 13.vi.05; a male visited two (Dutch) hyacinths, and then a patch of *Aubrietia* at 1 p.m. on 14.iv.11. I have also recorded oviposition by a female on flowers of *Rhododendron* "Purity." Other notes (unpublished) I have on this interesting species refer to its *pairing*, viz., that I noticed a couple paired near Hazeleigh Wood, at 4 p.m., on 29.v.18, sitting side by side on sloe leaves, the feet of each grasping different leaves. My second note concerns the fact that the larvæ are sometimes frequented by *ants* in England, as is the case with the larvæ of several other *Lycanidæ*. extract the note in full from my *Index Entomologicus*. "I noticed

two ants running backwards and forwards over a full-fed larva at Hazeleigh Rectory, at 2 p.m., and four ants doing the same at 5.30 p.m. on 31.viii.06, the hottest day in the year, the temperature being 90 degrees in the shade. When I 'gathered' the larvæ (at 5.30) the ants left it very unwillingly. There were no ants on nine other larvæ found the same day. Next day (also very hot) I found a larva on the same part of the ivy at 11 a.m., with two ants running over it, stopping now and then to suck out some sweet exudation. There were many of these same ants on the ivy, especially at the tips of new shoots, where they were milking black aphides."—(REV.) G. H. RAYNOR, M.A., The Lilacs, Brampton, Huntingdon. October 20th, 1921.

NOTES ON THE SEASON.—Although the season was undoubtedly "forward" at first it appeared to become normal after July, judging from the insects one got, at any rate in this neighbourhood, and so far as ordinary single-brood insects were concerned. For instance, *Noctua xanthographa* and *Bryophila perla* came to light in August, as they usually do, and, later on, *Oporabia dilutata*, *Agrotis segetum*, *Anchocelis pistacina* and *A. lunosa*, and *Eubolia cervinata* arrived as usual in September and October. Of late years one *Eupithecia linariata* and one *Ennomos alniaria* have succumbed to the same attraction every autumn until this year, when the *alniaria* failed! Last year I was surprised at the appearance of a typical and fresh *Mamestra brassicae* on October 16th; this was not repeated this year, but a male *Porthesia similis* came instead on September 24th. It has always been an idea of mine that Lepidoptera which naturally appear in autumn are practically independent of weather conditions, and this exceptional year has proved no exception in those I have met with. The most noteworthy feature of the season here has been the scarcity of the larvæ of *Ourapteryx sambucata*, usually fairly common here and at Clapton, and the total absence of the perfect insect, so far as my experience goes, in the summer.—C. NICHOLSON, 35, The Avenue, Hale End, E.4. November 4th, 1921.

CURRENT NOTES AND SHORT NOTICES.

We have seen one of the "black machaon" (we understand there were two bred from the small batch of pupæ). It is a black machaon, black without a blemish, but we advise our readers not to give credence to the fairy tales in the daily press as to transactions which did not happen.

A prospectus has reached us of a scheme to publish a work on "British Butterflies," by Mr. F. W. Frohawk. There would be 70 coloured plates, imperial 8vo., comprised in 3 vols., with appropriate letterpress. The edition would be limited to 600 copies. But the appalling cost of production will probably stand in the way of the publication of what would be one of the "masterpieces" of the future.

Parts I. and II. of the *Trans. Ent. Soc. London* have just been issued. Illness of the chief officers concerned in its production have been the cause of the much regretted delay. The issue contains "Experiments on the Edibility of Insects," by Dr. Hale Carpenter; "Notes on Orthoptera in the Brit. Mus.," by B. P. Uvarov; "Notes on the Carabidae," by H. C. Andrews; "British Limnobiidae," by F. W. Edwards; "Rho-

palocera of the Dollman Collection," by N. D. Riley; "Some Australian *Chrysomelidae*," by A. M. Lea; "F. Walker's Heteromera," by K. G. Blair, etc. There are seven plates.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

May 26th.—NEW MEMBER.—Mr. G. T. Lyle, F.E.S., of Wallington, was elected a member.

XANTHIC ABERRATIONS.—Mr. Farmer exhibited a partly xanthic *Rumicia phlaeas* and a similarly coloured *Callophrys rubi*, both from Riddlesdown.

SOUTH OF FRANCE INSECTS.—Mr. Enefer, specimens of scorpion and field-cricket sent to him from S. France by Mr. Main, and the red ova of a *Trombidium* from garden earth.

PUPÆ OF *S. PRUNI*.—Mr. Neave, pupæ of *Strymon pruni* from N. Huntingdon.

OVA OF *C. MINIMUS*.—Mr. Simms, ova of *Cupido minimus*, and the beetle *Cryptocephalus aureola* from Eastbourne.

MELANIC E. ATOMARIA.—Mr. Goodman, suffused forms of *Ematurga atomaria* from St. Martha's Hill, Guildford.

H. IMPERIALIS.—Mr. Bunnett, the beetle *Hedobia imperialis* taken at Coulsden.

SEASONAL NOTES.—In remarks on the season it was noted that *R. phlaeas* was very common, *Celastrina argiolus* was very scarce, and that *Eulype hastata* and *Hemaris fuciformis* were out at Horsley.

REVIEWS AND NOTICES OF BOOKS.

THE BULLETIN OF THE HILL MUSEUM, a Magazine of Lepidopterology.—Edited by J. J. JOICEY, F.L.S., F.Z.S., F.E.S., &c. and G. TALBOT, F.E.S., October, 1921. Part I., 200 pp., 32 plates. Price 30s. for 3 parts. The Hill Museum, Witley, Surrey.

It has always been imperative that those who establish private museums and deal with large masses of new and hitherto unknown material, in order to adequately publish to the world the descriptions and biological details, which are the results of their collecting and study, must have their own journal. The staff of the "Hill Museum," Witley, for a long time have been fully aware of their urgent and growing necessity, and a few days ago we received by the kindness of Mr. J. J. Joicey, F.L.S., F.Z.S., F.E.S., a copy of his first venture, Part I. of the *Bulletin of the Hill Museum*.

The Introductory portion naturally contains an account of the inception of the Museum in 1906 and its subsequent growth, showing how it has absorbed the collections of Grose-Smith, Herbert Druce, Suffert, Colonel Swinhoe (*Lycaenidae* and *Hesperiidae*), Roland Trimen, Riffarth (*Heliconiidae*), Lieut.-Col. Nurse, Elwes (in part), Dognin, etc., and in addition obtained new material in great quantity from collectors in N. Peru (A. E. Pratt), I. of Hainan (C. T. Bowring), Dutch New Guinea and Arfak Mountains, New Guinea (A. E. Pratt), E. Central Africa (T. A. Barnes), the islands of Tenimber, Key, Misol, Obi, etc. (W. J. C. Frost), Central Ceram (the Pratts), etc. When one knows that an excellent permanent staff deals with this material and that the leading authorities in special groups are called

in as necessity arises, there must be a large amount of "results" not only to record but to publish. To illustrate this introduction, which is written by the able Curator, Mr. G. Talbot, there are plates portraying Mr. J. J. Joicey, the chief members of the staff of the Museum, and Messrs. Pratt and Barnes, the exterior and interior of the large hall containing the collections, library, etc., and the large annexe in which detailed work is carried on by experts. Mr. Talbot goes on to say that one of the chief aims of the collection is to get together in one place as large a number of forms of each species to illustrate its capabilities in the way of geographical variation; to aid this comprehensive aim a considerable amount of morphological work is undertaken. The association of species in the local faunas explored by Mr. Joicey's collectors is being largely worked out at the Museum. These associations are expected to yield much information on distribution and relationship, and the results obtained it is proposed to publish from time to time in the Bulletin.

In the work of the Museum particular stress is laid on the "Acquisition of Data." With such aims as stated above, the more exact and complete in detail these data are the better is the material capable of furnishing factors for the determination of such biological problems as the phenomenon of mimicry, protective resemblance, distribution and classification. The exhaustive suggested schedule of points in the data and its details is too long to reproduce in our pages but we note some of the chief headings, *viz.*, Locality, Climate, Time, Habit of Adults, Habit of Larva, Pupæ, Ova, etc.

In the first study, which we read was undertaken at the suggestion of Professor Poulton, Mr. Talbot deals with the "Euploeines forming Mimetic Groups in the islands (1) Key, (2) Aru, (3) Tenimber, (4) Australia, and (5) Fiji." These are treated of separately and the paper is illustrated by four plates showing the chief members of each group. It was, we are told, only by the careful summarising of the very large and consequently representative collections sent home by W. J. C. Frost that it became possible to write this admirable and suggestive paper.

Following this is a long faunistic paper dealing in sections with the major portion of the new material collected by F. A. Barnes in E. Central Africa and illustrated by fourteen plates and a map. The various groups have been worked out by Messrs. J. J. Joicey, G. Talbot, L. B. Prout and Miss Prout. This is followed by descriptions, accompanied by figures of new forms of Lepidoptera sent home by C. T. Bowring, Esq., F.E.S., while residing on the island of Hainan. The material sent was very extensive and is fairly well, we are told, representative of the Lepidopterous fauna of the island. The more complete faunistic study and the association of species will be dealt with in a subsequent and more complete paper. It is gratifying to note that Mr. Joicey has adopted the dictum laid down some time ago by M. Oberthür that all descriptions should be supported by figures and thus obviate the unavoidable ambiguity of a mere word painting, which often conveys to the student of after years but a poor indication of the actual insect described, and confuses and hinders the progress of our knowledge.

We welcome the fine new venture and congratulate Mr. Joicey on his high aims, and his staff, especially Mr. G. Talbot, who have taken so much skilful care in the carrying out of these aims.—H.J.T.

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Duplicates.—*Sybilla*, *Paphia*, *Io* (2), *Selene*, *Lucina* (2), *Ocellatus*, *Illustraria* (autumn) *Nastata*, *Roboraria* ♂, *Prunaria* (4) ♂, *Tipuliformis*. *Desiderata*.—*Castreusis* ♂, *Cucullina*, *Cribrum*, *Cinerea*, *Ravida*, *Ashworthii*, *Notata*, *Obfuscaria*, *Smaragdaria* and others, also vars. and local forms.—*Harold E. Winsor, Kent House, Cranleigh.*

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CHANGE OF ADDRESS.—*Rev. G. H. Raynor, The Lilacs, Brampton, Huntingdon.*

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7, 8 p.m. November 16th; December 7th. 1922, January 18th (Annual Meeting).

The South London Entomological and Natural History Society, *Hibernia Chambers, London Bridge.* Second and Fourth Thursdays in the month, at 7 p.m., Annual Exhibition, November 24th.—*Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.*

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street, E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. *Hon. Sec., W. E. GLEGG, 44, Belfast Road, N. 16.*

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The White Border of *Euvanessa antiopa*, L.

By E. A. COCKAYNE, D.M., F.R.C.P., F.E.S.

The pioneers of Entomology in this country laid great stress on the frequency with which a white border was found in British *antiopa* and in the older works the insect is often called the "white border" or "white petticoat." Haworth in discussing their origin says, "to suppose they come from the continent is an idle conjecture, because the English specimens are easily distinguished from all others by the superior whiteness of their borders." A long time has passed since we had an *antiopa* year, and it is now firmly established that they do come from abroad and are not bred in this country as Haworth believed.

Continental specimens are stated to have a pale border after hibernation, and almost all entomologists now consider that the white border of British *antiopa* is merely due to fading.

Tutt in his *British Butterflies*, p. 329, says "it was once supposed that the British specimens always had a white, instead of a cream-coloured, border, but this has been quite disproved."

Verity states that in Europe no specimen emerges from the chrysalis with a white border (*Ent. Record*, 1916, xxviii., p. 102). Many of the earlier entomologists were very accurate observers, and, I think, if we look at contemporary records, we shall find that we have discarded their conclusions too readily.

The following passage occurs in Newman's *British Butterflies*, "William Backhouse, in 1820, saw great numbers strewing the sea-shore at Seaton Carew both in a dead and living state, one of these in his collection has the pale whitish margin to the upperside of the wings so characteristic of our British specimens." In the periodicals of 1872, another year in which *antiopa* was abundant, there are numbers of records of specimens with white borders captured in August and September in good condition. Many of these must have been caught soon after having emerged from the pupa, and the whiteness of the border cannot have been due to fading.

It is said that in many cases the white border has been produced artificially, and it will be shown that at least one reputed British specimen is a faked example. But it seems most unlikely that faking would have been resorted to if the majority of British *antiopa* had not had a genuine white border.

I will now bring forward some new evidence of a different kind, which, I hope, will convince everyone that the old views were correct and that the modern ones are wrong. In the course of examination of many aberrations of Lepidoptera for scale defects I noticed in the British Museum collection an *antiopa* in bred condition from France with pale grey nearly transparent border, dull blue spots, and the ground colour a little paler than usual. Under the microscope all the upper and lower scales of the border were seen to be so extremely thin and tightly rolled up as to resemble hairs and to be quite transparent owing to absence of pigment. The blue scales were found to be rolled up or twisted, but the chocolate scales were normal in shape although a little less pigmented than usual. This discovery led me to examine a number of British specimens with the following result.

DECEMBER 15TH, 1921.

British Museum General Collection.

(1) Ponder's End. August, 1880. Leech Coll. White border. Good condition. Upper scales of border very thin, transparent and rolled up. Blue scales normal.

(2) Scarborough, 1872. Leech Coll. The border and other pale areas have been carefully painted white. It is probably a faked continental example.

Doubleday Collection.

(8-9) Seven specimens with no data. All have white borders. The first three have the upper scales of the border thin and rolled up, and the under scales thin and transparent and in some cases curled up at the edges. The blue scales are normal.

The fourth has the scales of the border in the same condition, but the blue scales are rather thin and pale. The fifth and sixth have the same scale defect in the border, but the blue scales are normal. In the seventh, a worn specimen, the under scales of the border are flat and pigmented, but such upper scales as remain are deficient in pigment and curled at the edge or rolled up. The blue scales are thin and some are curled or rolled up, while others are bent over sharply in the middle exposing the lower surface in the distal part.

Banks' Collection.

(10) Tottenham, 1877. In fine condition with white border. All the upper scales of the border and costal markings are thin, rolled up and devoid of pigment, but the light brown and blackish scales, which produce the speckled appearance of the border, and the blue scales are normal.

(11) Ex. Coll. John Scott. Pale cream coloured border. Upper scales with some pigment but curled at the edges and in some cases rolled up.

(12) Swalescliffe, nr. Whitstable, 1906. Deep cream border. All scales normal.

(13) Rev. E. N. Blomfield, Hastings. September, 1889. This specimen, which is supposed to have been bred in England because it discharged red fluid after capture (Barrett; *Lepidopt. Brit. Isles*, vol. i., p. 143), has a deep cream border with normal scales.

(14) G. L. Mosley. Huddersfield, 1872. Cream border. Normal scales.

(15) Ilford, Essex. August 15th, 1872. Ex. Dobrée-Fox Coll. Cream border with scales pigmented, but a little curled over along the edges.

(16) Caught by W. C. Bishop, Emmanuel College, near Baitsbite Lock, and given to his friend F. D. Wheeler. This has a whitish border with the upper scales transparent and rolled up. The blue scales are normal.

(17) Horning, 1872. Ex. P. B. Mason Coll. Cream border with no scale defect.

British Museum (British Collection).

(19) Female with white border. Extreme thinness, transparency and rolling up of upper scales of border and costal markings. Blue normal.

(20) E. Vigors' Coll. White border with as marked a scale defect as 19.

(21) Stephens' Coll. White border with very defective scales as in 19.

(22) Stephens' Coll. White border with very defective scales. Some blue scales rolled up a little.

(23) Stephens' Coll. White border with upper scales rolled up. Blue normal.

(24) Stephens' Coll. White border. Extreme thinness, transparency and rolling of upper scales in border. All blue scales thin and rolled up.

(25) No data. White border with same degree of scale defect as 23. A few blue scales rolled up.

(26) Captured by P. H. Desvignes, Lewisham, August 25th, 1872. White border with upper scales extremely thin and tightly rolled. Some blue scales rolled up.

(27) Ex Vigers' Coll. White border. Scales of border and costa thin and rolled up, but blue scales unaltered.

(28) Stephens' Coll. White border and costal markings in which upper scales are thin and rolled up. Blue normal.

(29) No data. (Set as underside). On upperside, border is white with thin rolled up upper scales.

(30) Stephens' Coll. (Set as underside). On upperside, border is white with upper scales thin and rolled up.

(31) J. H. Durrant's specimen. Captured Eedle, Horning Fen, 1873. In good condition with light border. Upper scales of border and costal markings thin and rolled up. Blue normal.

(32) J. H. Durrant's specimen. Captured by Eedle, Horning, 1873. White border with scales rolled up and transparent. Blue normal.

(33) Dr. Gifford Nash's specimen. Captured by Dr. Hallett, Kimbolton. White border with upper scales very thin and rolled up, under scales flat. Blue normal.

The scales on the under surface of the border were examined in a few specimens and found to be defective also.

Excluding the painted specimen from the Leech collection, out of 32 British *antiopa* 28 have abnormal scales in the border and pale costal markings, and in addition four have the scales in the blue spots defective.

The whitest specimens have the most defective scales in the border and only the most defective have abnormal blue scales. The scales of the upper layer are the first scales to show the defect, the scales of the lower layer and the blue scales are less easily altered. None of the British specimens are as abnormal as the French one, but the difference is one of degree not of kind.

The defect is of exactly the same nature as that in many other aberrations of Lepidoptera, and is due not merely to lack of pigment but to abnormal thinness of the chitinous part of the scale. It is a defect, which must be present when the insect emerges and which cannot be acquired afterwards.

This discovery makes it interesting to know the continental distribution of the white bordered *antiopa* and the proportion it bears to the cream coloured form in different localities.

In spite of the abundance of the species I can find few references to this. Barrett states that white bordered *antiopa* are common in Norway.

Linnæus in his *Fauna Suecica* describes the species as 'marginæ albo.'

Zetterstedt in *Insecta Lapponica*, p. 894, says "it is no rarity in Norway, Sweden and Lapland and has white margins."

Schoyen gives Arctic Norway and Labrador as localities, but does not mention the colour of the border (*Archiv. f. Mathematik og Naturvidenskab*, Christiania, 1880, v., pp. 119-228). Snellen says it is scarce in Holland and the border is yellow or white (*De Vlinders van Nederland*, p. 37). In Germany and France specimens with cream border are the rule. In America the border is even darker than in central Europe, but Lord Rothschild has seven from Yukon Territory all of which have white borders. He very kindly allowed me to examine two of these labelled Dawson, May, 1914. Both have the upper scales of the border and costal markings transparent, thin and rolled up, some so rolled that they look like hairs. The scales on the under surface are similar but not quite so defective. The chestnut and blackish scales, with which the border is heavily peppered, are all normal. The blue scales are pale in both, flat in one and curled over or rolled up in the other. The only two Norwegian specimens I have been able to examine are in the British Museum labelled "Knoblock, Norwegian Lapland, 1903." Both have white borders with the upper scales all very thin and rolled up to form a pointed extremity.

One has the blue scales of the forewings all rolled up and some of those in the hindwings in a similar condition, the other has some blue scales flat, others rolled up.

Mr. G. Talbot says there are no specimens in the Hill Museum from Scandinavia or Arctic America. A white bordered specimen from Platea, Greece, which has undoubtedly been on the wing for some time has normal scales. No doubt it is faded.

A specimen, slightly yellowish, from Ancona, Italy, has some normal and some defective scales, and in a similarly coloured one from Central Russia all intermediate forms are found between quite pointed scales and large dentate ones.

From this evidence one gathers that a large proportion of the *antiopa* found in Europe and America in the Arctic Circle at the northern limit of their range are white bordered, and that this form becomes much scarcer further south.

This supports Stainton's contention that the majority of British *antiopa* are immigrants from Scandinavia and not from the south. (*Ent. Month. Mag.*, 1872-73, ix., pp. 105-107).

If so, there ought to be records of its unusual abundance in Scandinavia in the great *antiopa* years.

The only reference to this, which I can find, is in the *Zoological Record*, vol. ix., when it states that this species was much commoner than usual throughout Northern Europe in 1872.

It would be very interesting to know whether the scale defect is hereditary, or whether it is due to the uncongenial climatic conditions near the northern limit of its range.

Norwegian entomologists could easily settle the question by breeding from white bordered specimens.

The result would throw light on all the other scale defects, in which one part of the pattern is affected and the rest remains unaltered.

Temperature experiments have not produced white bordered specimens, so that I am inclined to think it is hereditary. In conclusion I should like to thank Lord Rothschild, Messrs. Durrant, Riley and Talbot, and Dr. Nash for their kindness in helping me so readily.

Since I wrote my article Professor Poulton has allowed me to examine the *antiopa* in the Hope Collection. There are 24 British specimens of which nine are from the Dale Collection. Nineteen have defective scales in the border, and six have defective blue scales. One from Latham taken near London about 1793 has the upper scales of the costa and border thin and rolled to a point, and some of the blue scales near the apices of the forewings pale and rolled up. One with the border nearly white, labelled "Kirkman's Sale 1847," has the upper scales so tightly rolled as to resemble hairs; and some of the under scales have their edges curled up and many of the blue scales also. Kirkman's other specimen, 1847, has the border cream coloured and the scales normal. Of the remaining fifteen all except four have some defect of the upper scales of the costa and border; two of these labelled "Hope" have the under scales transparent and curled at the edges. Two taken by the Misses Lowe in August and September, 1872, both in good condition, show the defective upper scales very clearly.

Another in fair condition with very pale border, labelled "August 29th, 1900, nr. Dunmow, Bigods, Meldola Coll.," shows extreme transparency and rolling up of the upper scales.

A hibernated specimen from Mapledurham, and one labelled "H. S. Sellon Coll., Worthing, 1879," has abnormal blue scales in addition to the thin, tightly rolled upper scales of the border. Of the Continental specimens a very worn one from Lapland has the few remaining upper scales thin and rolled up and the under scales flat and transparent. The blue scales on the forewings are thin and rolled up, and many of those on the hindwings are curled or bent over. A female in very good condition labelled "N.W. Finland between Muonio and Kittilä, 17. viii. 97, H. C. Playne and A. F. R. Wollaston," has all the upper scales in the pale cream border rolled up very uniformly, but the blue scales are flat. A specimen with a slightly darker border from the same locality has all the scales normal. A worn female from "Hyères, S. France, 19. iii. 98," with a pale border, has the upper scales thin and rolled up, and the blue scales nearly all curled up at the edges, and a worn female from Courmayeur, Savoy, 6500 feet, has extremely defective upper scales in the pale border and curling of the blue scales.

Dr. Staudinger has sent me a pale bordered *antiopa* in very good condition from "Kentei, Trans-Baikal Province, Siberia," in which the upper scales of the border and costa are transparent and tightly rolled up and some of the blue scales rolled up too. In the British Museum are two specimens with the upper scales so thin and tightly rolled that they look like hairs, and all the blue scales also are very thin and rolled up to a point. One is from Bhotan, the other was taken by Lord Walsingham at Camp 44, California, Western United States of America.

The presence of the same scale defect in these British *antiopa* from

the Hope Collection taken in years when it was uncommon such as 1847, 1858, 1882, 1894 and 1900, as well as in those taken in 1793 and 1872 confirms my view that most of them come from Scandinavia.

Seasonal Polymorphism and Races of some European Grypocera and Rhopalocera.

By ROGER VERITY, M.D.

(Continued from page 193.)

Pieris napi, L., subspecies *vulgaris*, Vrtý., race *uMoris*, mihi.—On comparing a series of *napi* I collected in the first half of April at Forte dei Marmi, in the marshy meadows which stretch for miles along the sea-shore in Northern Tuscany, with a series collected in various localities of the neighbourhood of Florence, where the soil and climate are comparatively very much more dry, I find a striking difference in their aspect. The Florence race, which is my nymotypical *vulgaris*, constitutes about the most extremely distinct race I have seen from the nymotypical arctic *napi* and *bryoniae*, O.; see *Linnean Soc. Journ. Zool.*, xxxii., p. 177, and *Ent. Rec.*, xxviii., p. 77. Instead, the race from the marshy and maritime locality mentioned, where all the species of *Rhopalocera* show signs of the effect of dampness in their features, exhibits characteristics which bring it a step nearer these latter natives of damp and cold climates. It may be said roughly to correspond to the race of Ireland and the north of Scotland, which I have called *britannica*, although it never produces the yellow and the more heavily marked forms of its extreme females; the Florence race, on the other hand, corresponds to the English race *septentrionalis*, Vrtý., minus its northern features, described in the *Ent. Rec.*, l.c. In *Rhopalocera Palaearctica*, I figured in 1908 on Pl. xxxii., a male and a female from the Forte dei Marmi, because they had struck me as being an unusually pale extreme form. It was only lately I realised that, on the contrary, in Florence, that very form, together with slightly darker ones, are found nearly exclusively; the male form of fig. 3 on the plate just quoted is frequent too, but of the one of fig. 2, with a very large black apical crescent, I have never seen another specimen from that town. At Forte dei Marmi it is quite the reverse: the last form mentioned is frequent and most individuals resemble the Irish male of fig. 4. Females with nervural black streaks as extensive as in the Irish female of fig. 5 are frequent; as a rule, this sex approaches this form, or else it has finer streaks, but there is a broad apical triangle of the same shape as in the summer brood, such as there never exists in the Florence race; this is dark gray rather than black, as in the summer. On the underside both sexes show on the forewing a tendency to darkening of the neuration by black scales much more markedly than in the Florence race, and the "veins" of hindwing are darker and sharper, the ground colour being usually white or very pale yellow, and never of as bright a tinge as is frequently seen in Florence.

Epinephle jurtina, L., race *præhispulla*, mihi.—In 1919, at page 124 of the *Ent. Rec.*, I applied the name of *phormia*, Erbst. [*Intern. Ent. Zeit. Guben.*, III., p. 117 (Aug. 1909)], to the race which is generally distributed over the whole of Central Italy, except the

highest mountain localities; the race of the latter localities I described as similar to that of Central Europe and called it *janira*, L. Last year, during my visit to South Tyrol, I carefully searched for *jurtina* at Meran, whence came Frühstorfer's "types" and which can be considered one of the very hottest spots of the Southern Alps, and I also collected it in the Isarco Valley, where it was identical with the Meran one, at Kobenstein, m. 1300, and at the Mendel Pass, m. 1300, where it was also quite the same. What I realised at once, when collecting this race, was that Frühstorfer's few and vague words of description, and his unaccountable misleading statement that "it stood near *telmessia*" had not conveyed to me in the least its true position amongst the other races. With the materials I now have at hand I see it belongs most decidedly to the same group of races from Central Europe as *janira*, by its smaller size and frailer look, more pointed wings and straighter outer margin, as compared to the race of Central Italy. It is only a little larger and a little more extensively fulvous on forewing than *janira*. The high mountain race of Central Italy can with more accuracy be called *phormia* than *janira* and I have an exactly similar race from Puybilliére in Vendée, larger than *janira* is generally in the North of France. The race of the lowlands of Central Italy belongs instead perfectly clearly to the *hispulla* group of races from Southern Europe, although it is only the first step or grade in that direction and there is still a grade detectable between it and *hispulla*, which I have described in the *Ent. Rec.*, l.c., as *emihispulla*; I should call *præhispulla* the race I had till now called *phormia*, taking the race of the neighbourhood of Florence as "typical"; it is larger and more robust looking than *phormia*, with wings more rounded; outer margin more convex; eye-spots larger, and with a conspicuous white pupil in both sexes; male often with a small fulvous patch on disc of forewing and with one quite as broad as in the *telmessia*, Z., figured by Seitz on Pl. 48a, but a little shorter, in about 5 out of my 90 specimens from Florence (Pian di Mugnone); females usually with a small fulvous patch beyond the end of cell on hindwing; it is entirely missing in 25 out of my 70 specimens from the locality just mentioned; it extends on the contrary into a well-defined band in 3 cases, recalling by its extent *emihispulla*, but not the following *hispulla* grade. Race *præhispulla* is about the most variable of the species; it gives one the impression of occupying a central position in the variation of the species, just as geographically, in point of fact, it does come from a region lying in the middle of the others; its individual variations clearly point, in one direction, to the Western and Southern races, which from *emihispulla* of Elba and Southern Italy lead through *hispulla*, Esp., to the finest nymotypical *jurtina* (usually called *fortunata*, Alph.) of Africa and Sicily; in another direction they point to the opposite line of variation, which, through *phormia*, culminates in the weakly northern *janira*, L.; in a third direction they acquire features which recall the Eastern *telmessiaeformis*, Vrtý., race.

Erebia epiphron, Kn., race AMPLEVITTATA, mihi.—In 1912, Signor Costantini of Reggio Emilia, had collected half-a-dozen specimens of this species, on July 23rd, at the Foce a Giovo, m. 1674, on the Alpe delle Tre Potezze, where there is the boundary between Tuscany and

Emilia. That was all one knew of *epiphron* in the Tuscan Apennines. Last year in June Querci discovered it on Mt. Sumbra, m. 1400, in the Alpi Apuane (N.-W. of Tuscany), and collected quite a nice series. This has revealed the existence of a very distinct race, hitherto unknown. Constantini's two specimens in my possession evidently belong to the same. It corresponds exactly to the race of *E. ceto* from the same mountains, described by me in the *Ent. Rec.*, xxxi., p. 124, and, like it, it stands exactly opposite to the extremely dark race of the Sibillini Mts. of a more Alpine nature and flora, although situated further south in Central Italy, because it exhibits a most unusual extent of fulvous markings. Both sexes have a broad and perfectly continuous band of bright fulvous, a little lighter in tinge and extremely broad in female; its outline is sharp on both the outer and the inner side, and quite straight or very slightly dented on the latter even in male; in a few individuals of this sex the nervures are thinly darkened, but the band is never broken up into separate spots; the black spots are small, but in most males and in all the females there is a complete series of four; in the Sibillini race this is quite exceptional. Race *cydamus*, Frhst., from the Maritime Alps, by its large size, bold fulvous markings and bright colouring is clearly a lesser grade of variation in the same direction as the extreme race of the parched Tuscan Apennines.

Erebia gorge, Esp., race *ERYNIS*, Esp., trans. ad *CARBONCINA*, Vrtý. [*Bull. Soc. Ent. Ital.*, xlvii., p. 54 (Dec. 16th, 1915)].—One of the most interesting discoveries made by Querci last year was that of this species in the Alpi Apuane (N.-W. of Tuscany). It was unknown in the northern part of Central Italy. Calberla records it (*Iris*, 1887, p. 135) from the Gran Sasso, as *erynis*, Esp., and Querci had found it in the Sibillini Mts. at the Fonte della Pescolla in July, 1911; the following year he searched for it again several times at the same spot, but with no success. This race I described as "remarkable by its small size, very limited fulvous markings, ocelli absent or reduced to minute spots, underside of hindwing of a uniform deep black colour." It thus corresponds to the usual very dark races of all the *Erebia*, except *neoridas*, B., in those mountains. *E. gorge* seems to be found in Central Italy only on most out of the way summits quite difficult to reach. As mentioned by Querci at p. 11, he found only one specimen in the Alpi Apuane at the Fosso dei Granchi, m. 1500, on Mount Pisanino, after a toilsome ascent of hours through the marble region. Its features are intermediate between *carboncina* and the *erynis* I have from Arpetto in the Western Ligurian Apennines, the nearest locality known of this species: the fulvous is very extensive and deep in colour on forewing, but reduced to three very small round spots on hindwing; there exists on forewing one minute apical ocellus with a white pupil scarcely perceptible; on the underside of hindwings the markings are vaguely shadowed, so that the former are not of a uniform black, as in *carboncina*, but the general tone is very dark.

Melanargia galathea, L., race *CALABRA-PROCIDA*, Vrtý.-Hrbst.—The rule, so common in Calabrian races, holds good also in this species: it is very different looking there from the races of Central Italy, and by its size and extensive dark markings it resembles *procida*

of the Western Alps and *tenebrosa*, Frbst., of the Adriatic Eastern coast. I have mentioned in this journal, xxxi., p. 125, the magnificent melanic race discovered by Querci on the Altipiano di Carmelia, m. 1200, on the Aspromonte, and which I have named *calabra* [*Bull. Soc. Ent. Ital.*, xlv., p. 215, pl. I., figs. 9-11 (1914)]. At S. Fili, m. 900, on the Coast Range, a race has been found which can be described as perfectly transitional between it and the particularly large and dark *procida* from the Var. The breadth of the black bands is as in the latter and far from the very great breadth of *calabra*, but an extensive black suffusion at the base of the wings reminds one distinctly of *calabra* or of *tenebrosa*, for it is never seen in *procida*, except as a vestige; the series of little white premarginal spaces are lesser than in *procida* (in which, as a rule, at least three exist on hindwing and one on forewing) and in about 1% of the males these spaces are entirely obliterated (ab. *nicoleti*, Culot); this is a very unusual frequency for this rare form; even a female of it has been found; it is probably unique.

Melitaea athalia, Rott., race *OBSCURA-MAXIMA*, Vrtý.-Trti.—In the *Ent. Rec.*, xxxi., p. 194, I have described the race of the Altipiano di Carmelia on the Aspromonte; the one found at S. Fili can, on the whole, be referred to it: it has in most individuals the same deep reddish-fulvous colour and the extensive black pattern; most females have a black suffusion at the base of wings; on the underside of hindwings the pattern is bold and bright; in the females a central series of silvery white spaces is nearly constant. On the other hand, the lesser altitude of S. Fili produces a modification in the aspect of the race in that very large individuals occur sparingly, which are quite similar to those constituting the race of the Calabrian coast, called *maxima* by Turati, and found also in the Isle of Elba. One female is transitional to the ♀ form *paleatineta*, Vrtý., by its very pale, whitish ground colour. Others of both sexes are strikingly *punctifera*, Vrtý., having a central series of round, black spots across the hindwing above. One male is a beautiful transition to the melanic ab. *cymothoë*, Bartoloni (*navarina*, Selys); the forewings are entirely black, with only one series of fulvous spaces, as in *cymothoë*; the hindwings are only partially obscured in their anterior half.

Melitaea parthenie, Borkh., race *INANIS*, mihi, and race *PLENA*, mihi.—I have received series of this species from several French and Swiss localities. On comparing them I find that individual variation is considerable everywhere, but that geographical variation is very limited and indefinite and does not give one the impression of different local races. Others must have come to the same conclusion, because a great number of races have been described in its near allies, but of this species none are to be found in literature. I was all the more struck by the appearances of two French races, which are obviously different from the more usual one of *parthenie*, taken on the whole. We can consider the latter as well represented (if two figures can convey the look of such a variable species, individually) by Oberthür's fig. 347, *bis* and *ter*, in *Ét. Léop. Comp.*, iv., except that the size is rather larger than it is on an average; his specimens are from Rennes and Cesson in N.-W. France. One of the races I mean to distinguish is the one

of Pont-de-l'Arche (Eure) sent to me by Dupont. He informs us in his *Catalogue des Lépidoptères* of that region [*Bull. Soc. Amis des Sciences Nat. de Rouen*, 1902, p. 23] that it has two generations. I only know the second one. It at once strikes one by its small, uniform size, frail build, and still more by its pale colouring. Closer inspection shows also that it does not vary individually as much as most other races; the black pattern in both sexes is constantly very complete, but the streaks are notably thin; the marginal one is more or less visibly divided in two, as it always is to a far greater extent on the underside. In the female the black pattern is never very much thicker than in the male, but the fulvous is in some specimens replaced by a dirty white tinge in some of the spaces. A very similar race I have from Thennelières in the Aube, but it is more variable and comes a step nearer the usual aspect, seen, for instance, at Angers, at Aix-les-Bains (where I collected it in the company of Charles Oberthür, on the summit of the Mt. Revard), round Geneva, in the Jura, etc. Instead the other race, which stands out amongst all these, is one sent from the Gironde by the Abbé Sorin. The peculiarity here is the very unusual extent of the black markings, which makes it stand quite opposite to the preceding *inanis* race of the Eure. So unusual is it that, notwithstanding the look of the underside of hindwings, unmistakably of a *parthenie*, although the extraordinarily thick black streaks do alter the aspect also on that surface, I did not feel at ease about these insects till I had sent one to Dr. Reverdin and got his verdict from an examination of the *genitalia* (slide 6230 of his files) that it was quite clearly a *parthenie*. The look of upperside suggests much more a small *athalia*, or still better, that very interesting little *Melitaea* from Turin, which I have called *aureliaeformis* (see *Ent. Rec.*, xxxi., p. 193), and which Reverdin has since actually discovered to be a species perfectly distinct from any other yet known, by its remarkable *genitalia*; there is no transition to *athalia*, as I had thought, on account of the superficial resemblance of some individuals. In the Gironde *parthenie* in question here, what is particularly characteristic is the breadth of the two premarginal black streaks on all the wings; the fulvous spaces between them are reduced to small round spots, instead of long rectangles; the spaces between the outer one of the two and the marginal band are also reduced to very small round spots, instead of the usual lunulate shape; thus, some of the chief *parthenie* characteristics are quite abolished in this race. The fulvous is of a duller and deeper reddish tinge than in any *parthenie* I have seen and recalls the tone of some *athalia*. I unfortunately do not know the exact locality of this race in the Gironde. Two specimens from St. Côme Bazas, sent the following year by Sorin, are quite different and belong to the most diffused race of the species, although this locality also is in the Gironde.

(To be continued.)

Rearing *Callimorpha quadripunctaria* (hera).

By J. F. BIRD.

As I have been fairly successful with *Callimorpha quadripunctaria* (*hera*), which, I believe, is considered rather difficult to rear, the following notes may, perhaps, be found of some use.

On September 6th, 1920, I netted a ♀ near Teignmouth, in South Devon, which I kept in a chip-box for ova. She laid 37 eggs, 10 the first night, 13 the night following, and the remainder during the day-time on September 8th, after which I allowed her to fly away in the evening, as I considered I had obtained a sufficient number of ova to experiment with.

The larvæ began to appear on September 15th, and all hatched out, except one from an egg laid loosely, during the two following days. At least, I think all but one must have come out, although I was never able to count more than 34 young larvæ, so presume that two escaped when newly hatched. For their first meal they demolished their egg-shells without leaving a trace; afterwards they "browsed" on the leaves of groundsel which I started them off on, but after a few days I tried them with several other plants and found they would eat dandelion, perhaps their favourite pabulum, and also forget-me-not and bramble, but do not fancy they much relished the two latter, as these plants were practically neglected when either dandelion or groundsel was offered at the same time. Eventually I fed them principally with dandelion, and groundsel occasionally for a change, including the buds and opening blossoms of both these plants which they seem partial to.

In reading up notes on the life-history of this insect I find that it has been advised to keep the larvæ in a lofty breeding cage, so that they may obtain plenty of air, but I decided to try a different method. I therefore kept my young larvæ in a large chip-box, which I placed in a pigeon-hole within a closed bureau in a room heated with a fire throughout the winter months. My idea being that the larvæ would thus enjoy a fairly equable temperature during the cold weather; and for providing them with sufficient fresh air I made a point of opening the box I kept them in every morning and evening, and generally once or twice besides during the day.

The larvæ have a habit, when not feeding, of resting on the lid of the box where, also, they undergo their several moults. The first moult took place about the first week of October, and the second at the end of the month, the last individual doing so on November 6th, on which date a few of the more forward larvæ were making preparations for their third moult. On November 15th, several had shed their skins for the third time, and all the others were on the lid of the chip-box preparing to do so, which all succeeded in doing by November 28th. As my larvæ had grown I now kept them in two chip-boxes and continued to keep them in my bureau. At this stage the larvæ do not feed much, and about the middle of December a cold snap made them very sluggish. On the 27th of the month I was doubtful if any were feeding, but I continued to put fresh food in about every other day as the weather had become very warm for the time of the year.

December 29th.—One larva came down from the lid and fed a little on dandelion. Its example was not followed by any of the others until about the middle of January.

January 19th.—During the last two or three days several of the larvæ commenced to feed again on groundsel, and I noticed that one or two of the caterpillars were eating into the blossoms.

January 23rd.—All the larvæ have been feeding well and some are nearly, if not quite, half an inch in length. To-day, one of the largest is preparing for its fourth moult.

January 26th.—Several now are preparing for the fourth moult.

January 27th.—In the morning I found one had completed its fourth moult, and on looking at the larvæ again, at 2.15 p.m., found another in the act of shedding its skin.

February 10th.—All, except one larva, have shed their skins for the fourth time.

February 13th.—One still has to undergo its fourth moult, yet a few are preparing for their fifth.

February 14th.—The laggard has at last completed its fourth moult.

February 16th.—The first larva has completed its fifth moult. I am now keeping the larvæ in two large chip-boxes and a larger cardboard box, pierced with holes, and still placed in the bureau.

March 6th.—All have now undergone their fifth moult, and several are preparing for their sixth.

March 17th.—These larvæ are inclined to cannibalism, and at this stage should not be kept crowded. I kept ten of the largest in a circular cardboard collar-box and, unfortunately, neglected to look at them yesterday, and found, to-day, that some had completed their sixth moult, and that two of the larvæ were missing, which reduces the number of my larvæ to 32. My larvæ are now kept in several cardboard boxes, with the lids pierced with small holes for ventilation, and I am keeping them in a small side cupboard in my bureau.

March 21st.—I found one of the larvæ had been partly eaten by one of its companions, but still alive, so had to put it out of its misery.

March 25th.—I had to kill another larva to-day which was unable to moult, so have only 30 left. I am now keeping my boxes of larvæ on a shelf in a pantry.

April 15th.—I counted the larvæ to-day and find I have only 28 left as I have had to kill two more that had been attacked, when moulting, by their more advanced companions. Since then I took care to remove all the larvæ that had completed their last moult (as soon as they had sufficiently recovered from the operation) and placed them in large boxes by themselves, and was careful to keep them provided with plenty of food. These larvæ, apparently, become slightly cannibalistic after completing their sixth, and last, moult. They then attack the larvæ that are preparing for, or have just undergone the process of moulting and, consequently, are helpless to defend themselves. When all are in their final coat, and have been feeding again for a day or so, they seem to quite lose this cannibalistic tendency.

At the beginning of May the larvæ were full-fed, and before spinning up grew appreciably smaller, that is to say in length. During the first week in May they commenced going down to get under their food-plant, where they made a few webs—the merest apology of a cocoon—in the folds of a leaf, or else between a leaf and the bottom of the box. Unfortunately, four escaped from the boxes I kept them in—how they managed to squeeze out of the tightly fitting lids is a mystery! However, I found one of the wanderers under a cardboard box, on the shelf where I keep my larvæ, where it had formed a flimsy cocoon.

May 14th.—One larva has pupated. Several have attempted to form cocoons on the lids of the boxes, and one or two on the sides, but all but one fell, or else came down to pupate after remaining a few days in their very slight webs.

May 25th.—All have pupated, including the one that remained to do so on the side of a box. The pupation of the latter was not a success, as the pupa was malformed through becoming loosened from the cocoon and, being entangled to the web by its anal extremity, was bent up against the bottom of the box, in which shape it hardened. This was one of the few pupæ that failed to produce a moth.

July 8th.—The first two imagines came out during the middle of the day, and two more in the afternoon, one of the latter being a cripple. The moths are very restless and flutter or crawl about the pupa-box after becoming fully developed, which is generally about an hour or so after emerging. I find it rather difficult to know when to take them, for if one leaves them a little bit too long they are apt to spoil themselves, but if taken too soon the wings become very limp after being placed in the killing-bottle.

July 10th.—Another emerged, but being unable to completely detach itself from the pupa-case the hindwings were crippled.

July 11th.—Another emerged about 10 a.m. (G.M.T.), and two more in the afternoon. The one that came out in the morning was rather badly bitten on the back while in the larval state when preparing for its final moult, but it managed to change its skin, with a little help on my part, and in the end successfully pupated. I kept it by itself to see if the imago would show any signs of the injury to the larva, and notice that there is a slight scar showing on the upperside of the abdomen.

July 12th.—Two came out between 10 and 11 a.m., and a third about 4 or 5 p.m.

July 13th.—Five came out between 9 a.m. and mid-day, and a sixth in the evening about 6 p.m.

July 14th.—One emerged between 8.30 and 9 a.m., and a second, the last to emerge, about 10.15 a.m.

I gave three fully-fed larvæ away in May, and I have since heard that two imagines were successfully bred from them. Including these the result from my 37 ova is as follows:—One ovum (laid loosely) failed to hatch, five larvæ escaped, one larva had to be killed as it failed to shed its skin, four larvæ eaten or so badly bitten by their companions that they had to be destroyed: the remaining 26 larvæ pupated, and from them 21 imagines emerged, including two crippled, and another which was not kept as a specimen as it was malformed, having a hole in the middle of one of its forewings.

The sixteen moths I have kept are of good size and quite as large as specimens we have captured in South Devon, and the sexes are evenly represented. Besides the colour of the hindwings, which ranges from a darkish red to a light orange, there is, at first glance, not very much variation in my specimens, but on studying the pattern of the forewings I notice that the costal dash, between the two principal cream-coloured transverse markings, is much subject to modification. In its more developed form this may be described as a conspicuous cuneiform streak running from the costal margin, the wide end cream and the point orange, but in a number of specimens this wedge-shaped marking is either divided—so as to resemble a semi-colon, or colon—or else reduced to a single spot. In one of my specimens it is only indicated on the right wing by an almost imperceptible dot, and is entirely absent on the left.

NOTES ON COLLECTING, Etc.

SECOND BROOD OF *CRAMBUS CULMELLUS*.—A specimen of *Crambus culmellus* apparently quite recently emerged was observed here yesterday. Records of second broods among the Crambids are unknown to me, though a very extended emergence period is common with them. This date seems necessarily too late for that. The fringe was perfect and presumably the insect had emerged subsequently to a sharp frost of 4 or 5 days ago.—H. C. HAYWARD, Repton, Derby. October 31st, 1921.

ERASTRIA VENUSTULA.—I shall be very grateful if anyone can give me information as to any authentic captures of the above species in Epping Forest (*exact* spot immaterial) since 1887; also for records from any part of the British Isles, except the Sussex localities near Horsham and the Essex locality near Brentwood.—C. NICHOLSON, 35, The Avenue, Hale End, Essex.—Nov. 28th. 1921.

CELASTRINA ARGHIOLUS VISITING FLOWERS.—In August, 1895, this butterfly was to be seen frequently visiting the flowers of Hemp-agrimony for nectar, in lanes near Carisbrooke, I.W. I have also seen the spring brood at bluebell flowers, and have occasionally seen them attracted to roadside puddles, in hot, dry spring weather.—R. M. PRIDEAUX, Brasted Chert, Kent. November 28th, 1921.

SOCIETIES.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

June 1st. 1921.—The President, the Rt. Hon. Lord Rothschild, M.A., F.R.S., announced the death of Dr. Longstaff, and a vote of condolence was passed to his widow and relatives.

ELECTIONS.—Dr. Sharp, M.A., M.B., F.R.S., etc., was elected a Special Life Fellow; Mr. P. V. Castling, of Peshawar, India, and Dr. S. C. Harland, D.Sc., of Shirley Institute, Didsbury, were elected Fellows of the Society.

TREASURER'S STATEMENT.—The Treasurer made a statement explaining that the Society as a Friendly Society had been pronounced free from all income tax, except on the interest on the Debentures. He also made a statement as to the portraits of distinguished entomologists that had been hung in the Society's rooms, and expressed the hope that other portraits and documents of entomological interest would be presented to the Society. The President read a statement as to the death of a number of distinguished Russian entomologists during 1919-20.

Prof. Poulton exhibited varieties of *Pyrameis cardui*, and an example of a very large *Papilio*, *P. homerus*, F., that visits the very small flower of *Asclepias curassavica*; examples of *Libythea*, probably *L. larus* from Tanganyika territory, congregating perhaps before or during migration; notes on the courtship of *Monomotropa insignis*, Distant; Coprid beetles, believed to be internal parasites, and expressed the view that such cases were due to trickery on the part of native medicine men. Comments were made by the President and Mr. Durrant.

IMPERFECT EXCLUSION.—Mr. Donisthorpe exhibited a specimen of *Argynnis euphrosyne* carrying a portion of the pupa case. Some discussion arose as to the effect of damage to antennæ on the flight of butterflies.

EVERSIBLE GLANDS IN BEETLE LARVÆ.—Dr. Gahan exhibited examples of the larvæ of *Phytodecta viminalis*, and called attention to the existence in these larvæ of eversible glandular structures between the seventh and eighth dorsal segments. Comments were made by Mr. C. B. Williams, who said that he found *P. viminalis* to be viviparous.

BIOLOGICAL POINTS IN SOME HYMENOPTERA.—Mr. Morice exhibited (1) examples of *Anthophora pilipes*, of which he had seen no ♀s, and described attempts made by the ♂ to pair with ♀s of the Humble Bee; (2) a ♂ sawfly, *Tenthredopsis palmata*, Geoffr., with an abnormal wing venuration, apparently a reversion to a primitive type.

EXOTIC LEPIDOPTERA SHOWN.—Mr. Talbot, on behalf of Mr. J. J. Joicey, exhibited examples of *Heliconius* from Venezuela. Dr. Dixey exhibited *Pierinæ* from Central Peru. Comments were made by the President, Prof. Poulton, and Mr. Rosenberg.

PAPERS.—Two papers were read (1) by Mr. Donisthorpe on "Mimicry of Ants by other Arthropods," and the author exhibited a number of examples to illustrate this: comment was made by Prof. Poulton; (2) by Mr. G. Arrow on "Erotylid Coleoptera."

MID-MONTH MEETING.—It was decided not to hold the informal meeting arranged for June 15th.

REVIEWS AND NOTICES OF BOOKS.

INSECT TRANSFORMATIONS. By George H. Carpenter, D.Sc. 282 pages. With 24 plates and 124 other illustrations. Methuen and Co., Ltd. Price 12s. 6d.—Some twenty years ago Prof. Carpenter wrote a work entitled, "Insects; their structure and Life," the purport of which was more aptly expressed by its secondary title, "A Primer of Entomology." It was a concise outline of the whole subject of the study of insects. The volume before us is an intensive presentation of what was only touched upon in an outline then, *viz.*, "Insect Transformations."

So much life history matter has been discovered during the past two decades that our author found it a difficult task, he tells us, to give a balanced consideration of both old and new facts adequately to be of service equally to beginners as to older students. This object however he has admirably attained and we feel quite sure that those who read and re-read his previous volume will, as we shall, read and re-read the present work with pleasure and profit.

Prof. Carpenter begins his task with the detailed study of a few fully developed insects of different types, the grasshopper, the dragonfly, the butterfly, so that the purpose of the structure and habits of the immature creature may the better be understood "in the light of what is to be the end of its life-history." This chapter is headed "Form, Growth and Change."

The next two chapters deal with the earlier stages of insects having the titles, 1 "The Open Type of Wing-growth," and 2 "The Hidden Type of Wing-growth," and take up nearly a hundred pages. In the former the immature stages all have "outward and visible wing

rudiments" progressing in development at each stage of growth of the organism, while in the latter these structures grow "concealed" until the penultimate stage, the pupal, is reached.

This chapter is succeeded by a short one on "Some Wing-less Insects," and introduces us to the changes to which some of our too familiar beasties are subject, shewing that the special transformations that each undergoes are necessitated by the very peculiar environments which affect them. The whole Order of Insecta our author divides into 23 Classes, recognising the Dermaptera as distinct from the Orthoptera, the use of the term Neuroptera in a very restricted sense, excluding the mayflies as Ephemeroptera, putting the booklice and their allies as Corrodentia, the fleas as Aphaniptera and retaining the Strepsiptera.

A long chapter is taken up with the subject, "Growing Insects and their Surroundings," and gives a large number of very well chosen examples of the variety of form displayed by insects during their period of growth, with especial reference to this important question of Environment.

The last chapter, entitled "The Problems of Transformation," discusses "what light the transformations of insects throw upon the course of the great periods that mark the progress of life on our earth," and summarises what Miall, Dyar, Comstock, Sharp, Silvestri, Handlirsch, Brogniart, Tillyard and others have said on this comprehensive question.

The whole work is adequately illustrated by a large number of diagrams, and many references to the sources of much of the information are given, so that the earnest student may further his studies in each section. The volume is well printed and published and we have much pleasure in recommending it to our readers.—Hy.J.T.

APPLIED ENTOMOLOGY.—An Introductory Text-book of Insects in their Relation to Man. By T. H. Fernald, Ph.D., 400 pages, 388 text figures. The McGraw-Hill Book Company, New York and London. Price 21s.—This book is published "as a class-room text for an introductory course in the subject, which shall give a general idea of insects, their structure, life-histories and habits, with methods for the control of insect pests in general." In some 60 pages the first four chapters deal concisely with I. Insects and other Animals, II. The External Structure of Insects, III. The Internal Structure, and IV. The Development of Insects, and give sufficient detailed information to enable the average student to understand the effects of the application of controls for pests, and also to understand the notes on the various orders and families of insects treated of in the main body of the work. Chapter V., "Losses caused by Insects," summarises the Relationship of Insects to Man both directly on his person and indirectly by attacking his crops, and leads naturally to a consideration of controls, briefly describing the methods evolved by nature to retain a balance of its members struggling one with the other for the right to live. The next four chapters contain an important summary of the "Artificial Methods of Control," classifying them under "General Farm Practices," "Stomach Poison Insecticides," "Contact Insecticides," and "Fumigation Insecticides."

The bulk of the volume is a consideration of a selection of the

members of each of the 24 Classes of insects, which the author recognises, most of the examples chosen for description and illustration being in some portion or other of their life more or less injurious to man or to his crops. The book being primarily for American students, the types chosen are all from the Western Hemisphere and most of them dominant species of that fauna. This, however, should in no way deter readers on this side of the Atlantic, as the two areas have so much in common that even if the particular species used does not occur in Great Britain, a closely allied species of the same genus does occur, often undistinguishable at the first glance and with quite similar habits and habitats. Opening the book at random one finds, for instance, the carrion beetle a *Silpha*, the larder beetle *Dermestes lardarius*, the June bug *Phyllopertha*, the asparagus beetle *Crioceris asparagi*, the two-spotted lady-beetle *Adalia bipunctatus*, the gypsy-moth *Porthesia dispar*, the bee moth *Galleria mellonella*, and so on. Thus insensibly, as it were, the British student is led to a knowledge of the main features of the American insect fauna, by a study of species which have been selected particularly to unite the several points of view comprised in the author's object. With the account of the life-history of each selected species are added paragraphs concerning the specific controls which most adequately keep a check upon the over increase and development of the creature. The illustrations are quite adequate in execution and in sufficient number, as practically every species selected is figured, often with its various stages and characteristic depredations.

Not only has the author well carried out his aim for the class room, but he has further succeeded in producing a book which should be of much practical use to all outside who are interested in economic entomology. The publishers, too, have done their work quite well and we congratulate the author who has made an excellent and successful attempt to follow the footsteps of his able and learned father in entomological study.—HY.J.T.

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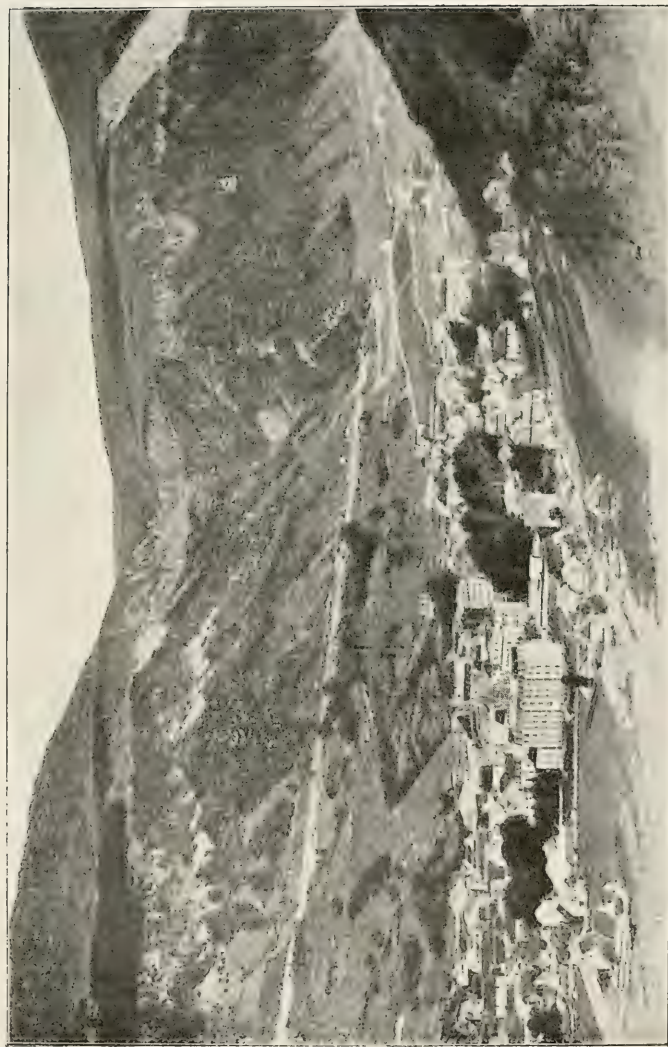
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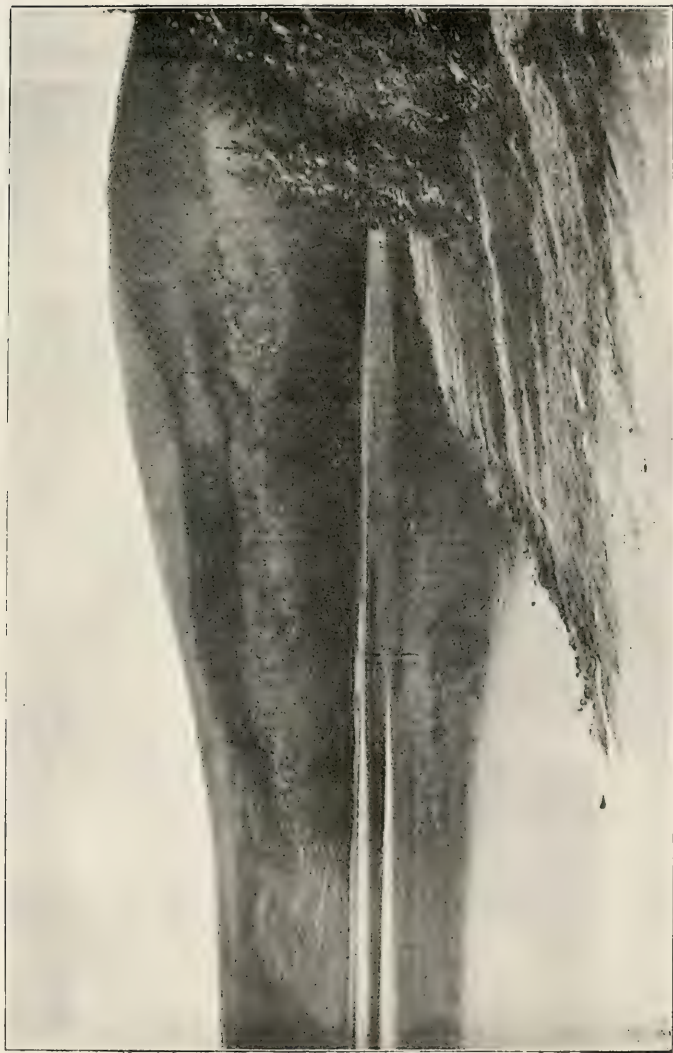
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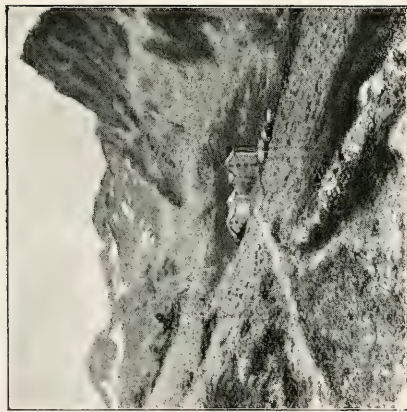
1920. p. 153, after "Bradfield" add "and also in June, 1914, by Messrs. Morley and Elliott at Palmer's Heath near Brandon."
- p. 154, line 7. *Apion rufirostre* should read *A. fuscirostre*.
- p. 154, line 8. *Bruchus loti* should read *B. ater*.
- Special Index, 1920, p. ix. delete "extensa-(malvoides ab.)."
- p. xv. "reducta (alveus ab.)."
- p. 14, line 23. for "calabra" read "calabrica."
- p. 40, line 42. for "pendularia" read "potatoria."
- p. 65, line 24. for "tuberculatus" read "tuberculosus."
- p. 71, line 52. for "Erebia" read "Epinephele."
- p. 132, line 39. for "lineola" read "lineolea."
- p. 137, line 31. for "albiana" read "olbiana."
- p. 164, lines 16 & 20. for "cleodoxa" read "cleodora."
- p. 181, line 17. for "Bupalus" read "Panolis."
- p. 198, line 37. for "Bombyx" read "Hemaris."
- p. 218, line 7. for "Haywand" read "Hayward."



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